

Flight, September 28, 1912.

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 196. (No. 39, Vol. IV.)

SEPTEMBER 28, 1912.

[Registered at the G.P.O.] [Weekly, Price 1d.
as a Newspaper. Post Free, Ltd.]



MR. GUSTAV HAMEL BACK AGAIN AT HENDON.—In our picture he is seen on his Blériot executing one of his hair-raising corkscrew *vol planés* at last Saturday's meeting at the London Aerodrome.

EDITORIAL COMMENT.

The War Office and the Monoplane.

According to the aeronautical correspondent of the *Daily Telegraph*, the War Office authorities have definitely decided that so far as the work of the Royal Flying Corps is concerned there shall be a permanent ban on the monoplane. Until we receive official confirmation of this astonishing statement we simply decline to credit its accuracy. Having regard to the regrettable accidents which happened during the recent Army manoeuvres, the military authorities were well within reasonable discretion, pending the issue of the inevitable inquiries and experiments, in placing the monoplane under a sentence of temporary suspension. But beyond this it is surely unnecessary to go, for the very sufficient reason that, as we pointed out in our Editorial article of last week, it is not by any means proved that the monoplane, *per se*, is any more dangerous than the biplane as a type. That being conceded—as we think it must be by any who have given serious attention to the question of design—it would assuredly be most short-sighted on the part of the authorities to deal such a disastrous blow at the development of an undoubtedly useful type of machine. That the effect of a permanent prohibition of the use of the monoplane would have a crushing effect is undoubtedly true. Indeed, there is already evidence that in many instances pupils are holding their hand in regard to courses of instruction in monoplane flying pending further information. Doubtless there are two reasons for this, the one being that recent accidents have engendered something of a fear for the safety of the type in more minds than those of the War Office authorities, while the other is that a large proportion of the pupils are either army or navy officers or those who intend to enter the Royal Flying Corps under the new regulations. Manifestly, it would be useless for them to qualify on a type which is condemned for the use of the Corps, even temporarily. For these reasons, therefore, it is very essential that we should know where we stand in the matter, and it becomes more necessary every day that the War Office should make known its views. To us it is simply unthinkable that the officers who have taken so keen and knowledgeable interest in the development of military aviation should allow themselves to be swayed by panic considerations, like the veriest tyro in aviation who rushes into print on the occurrence of every accident with the dictum that flying is against the intentions of Providence, and should therefore be stopped altogether; or, as in one precious scribe's words, at least not permitted until the pupil is able to fly.

Now, we would make it clear that if there were any real reason to believe that the monoplane was an unsafe type in consequence of some inherent fault impossible to be overcome, we should not hesitate for a single instant to throw all the weight of influence we possess against its further use, not only by our soldier aviators but by anyone. But we are satisfied that, as a machine, the monoplane is at little disadvantage with the biplane in the matter of comparative safety. Therein lies the whole pith of the argument that the matter is one for suspension of definite judgment until we know beyond reasonable doubt wherein lay the causes of the accidents which have induced the present attitude of the military authorities towards the monoplane.

Now let us look at the question from another point of view. The French manoeuvres have just ended, and

during their course a large number of monoplanes were employed upon precisely the same service as our own machines, and the records do not show a single accident of a serious nature. Therefore, it is to be assumed that the French military view is that the type is not only not unsafe, but it is eminently suitable for the work required of high-speed air-craft in war. Thus we may further presume that they will continue with the monoplane, eliminating any of the faults of design which may be present until they have reached the evolution of the perfect type. Meanwhile, if the report with which we are dealing should by any unfortunate chance turn out to be correct, we on this side of the channel will be placing ourselves at a grave disadvantage in comparison with our rivals. Before we reach the grave decision to place a permanent ban on a type of air-craft with which others are achieving marked success, let us at least await with open minds the result of those inquiries which are already on foot and which may enable us to reach a sober and unprejudiced judgment. The monoplane in its own sphere is as necessary as the biplane for its particular work.

The Aeroplane in War.

The more the published reports of the work of air-craft during the late military manoeuvres in this country and in France, and the deductions made from it, are studied, the more does the lay mind become involved in that "fog of war" which air-craft are supposed to have cleared up.

On the one hand we are told that the aeroplane has completely revolutionised warfare, because it is no longer possible for a commander to conceal his dispositions from an enemy equipped with an efficient air-corps. The days of fighting in thin, far-flung lines are over, it is said, because it is impossible to mask the weakness of certain points when the ubiquitous air-scout is in evidence. Therefore, the battles of the future will be fought along the tactical lines of the Franco-Prussian war, in which the attack in mass was the current vogue. On the other side, we are warned not to attach too much importance to the presumed lessons of peace manoeuvres, for the reason that even though the work of the air-craft was brilliantly successful in some cases, in others it was quite the reverse, and showed to demonstration that, while the aeroplane has its uses, it also has its limitations. Particularly was this shown in our own operations, when the air-scouts failed altogether to follow the movements of, or even to locate, a whole division. Moreover, we are reminded that in peace operations air-craft necessarily have a free hand, unhampered by any possible opposition from the other side. In fact, the analogy is akin to that of a warship at battle-practice, in which the target has no chance of hitting back, which necessarily makes all the difference. There are many questions in connection with modern war between civilised nations, the exact answer to which can only be given by the stern judgment of the war-god himself. As that delightful character, "Smithy," says: "There's only one kind of war, and that's the kind that hurts." And until the "kind that hurts" comes along—may the time be very far distant—the real value of air-craft must remain more or less of a hidden quantity. But we cannot afford to take the smallest chance. Until proved as of small account Britain must be second to none in being in a position to help to prove or disprove their worth.

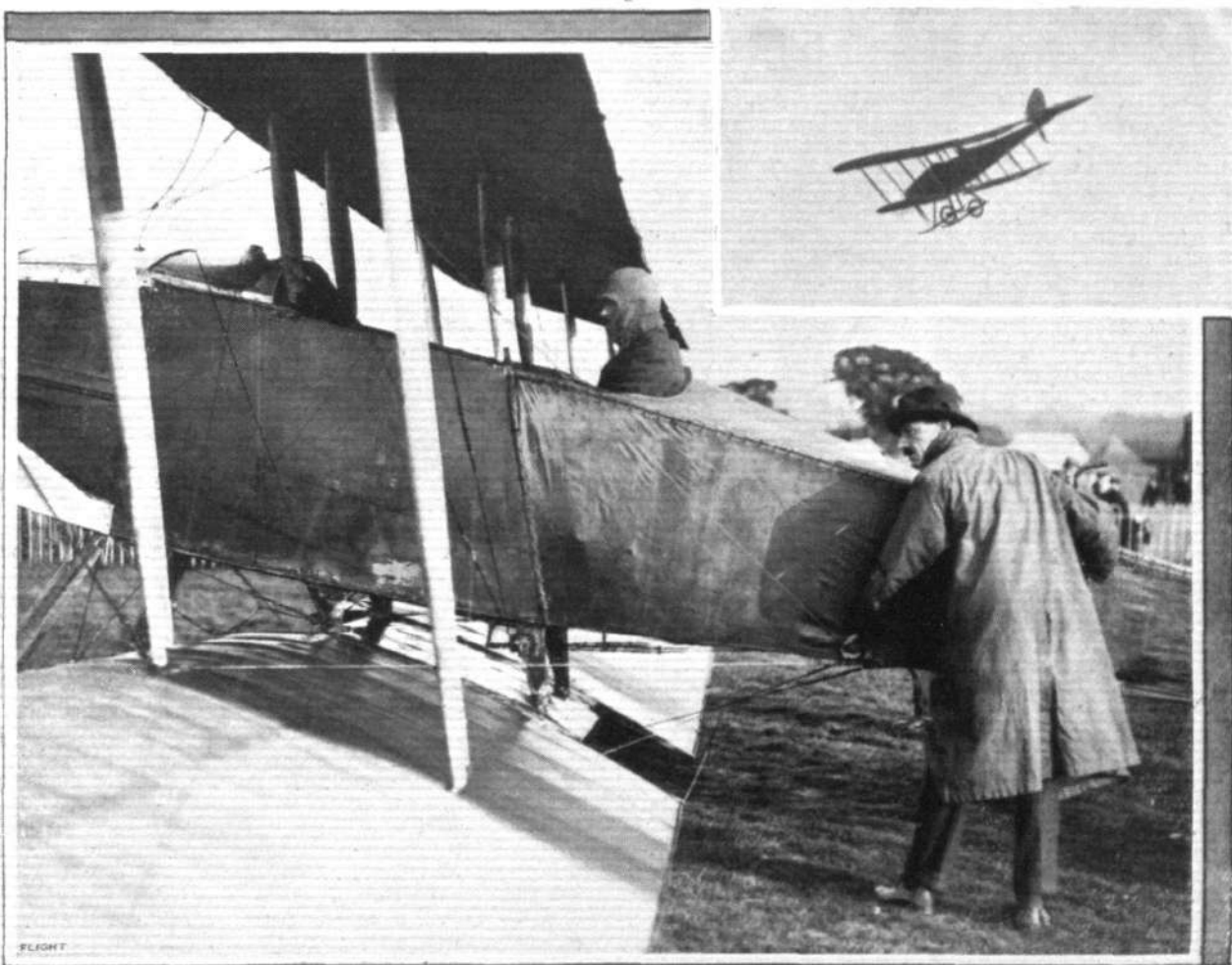
SEPTEMBER SECOND MEETING, HENDON.



Robert, as a handy man at the London Aerodrome, giving some weighty help to Desoutter when about to start on his Blériot for an exhibition flight.

EARLY last Saturday afternoon it seemed as though visitors to Hendon would see little in the way of flying, for a cold east wind was blowing in decidedly strong and unpleasant gusts. In any case competition flying was out of the question, even later in the

evening there being little improvement. But Æolus had not reckoned with such men as Hamel, Desoutter and British Army flyers, so that those at the aerodrome witnessed some exceedingly fine and daring flights. Everybody was pleased to see Gustav Hamel



Lieut. Fox, on Army biplane No. 203, just about to start for a flight at the London Aerodrome, Hendon, last week-end. Inset the same machine is seen in flight.



Lieut. Gordon Bell, on Army biplane No. 204, with Capt. Dawes as passenger, just at the moment before leaving the London Aerodrome, Hendon, on Saturday last en route for Farnborough. Note the mechanic in front, who has just swung the propeller.

back again, but his flying is more hair-raising than ever. Considerable interest was shown in the two Army biplanes (Nos. 203 and 204) of the BE type which had put up at Hendon on the way to Farnborough from the manoeuvres. Both had 70-h.p. Gnome engines, No. 203 having a four-bladed propeller, and with their slightly staggered planes they certainly presented a speedy and business-like appearance. Quite a number of well-known personages connected with aviation were at the aerodrome during the afternoon, including Messrs. Glenn H. Curtiss, A. V. Roe, Lieut. Parke and several members of the R.F.C.

At 4 o'clock Desoutter made a short flight on the 50-h.p. Gnome-Blériot (Gordon Bennett) and appeared to be hard at work at the controls. Soon after he had landed Hamel ascended on his old single-seater Blériot, to be followed immediately after by Lieut. Fox, R.F.C., on No. 203 Army biplane. These two pilots then gave a display, the like of which has not been seen at Hendon as far as the writer can remember. The manner in which Lieut. Fox banked and turned his biplane was really remarkable, it seemed almost to turn in its own length. One time Hamel made straight for Lieut. Fox as if to ram him, then, when quite close, the latter appeared to raise one side of the biplane while Hamel shot past underneath. Of course, they were really some distance apart, but from where the writer was standing it looked very fearsome. It is difficult to show in a photograph the steepness of Hamel's spiral *vol plané*, but we reproduce one in our frontispiece this week that should give a slight impression of one of these dives. Apparently, the inner wing tip describes a circle of very small diameter, so that it looks as though the monoplane were revolving round a

vertical mast with its inner wing-tip attached thereto. A little while after these flights Louis Noel brought out the 70-h.p. Gnome-Henry Farman, and as soon as he had ascended Lieut. Gordon Bell started for Farnborough on the other Army biplane, No. 204, with Capt. Dawes as observer. After making a couple of circuits of the aerodrome in order to attain a decent altitude, he headed for his destination and was soon out of sight. Hamel then gave another exhibition, and shortly after Lieut. Fox again took up No. 203 Army biplane, this time with a passenger. At the end of his flight he made a beautiful glide to earth, landing very gently. At about 5.30 Desoutter went for a spin on his Blériot, and Pierre Verrier tested a new Maurice Farman biplane, remaining aloft for some time. After this Lieut. Fox was up again, while Hamel went for a climb and R. T. Gates also put in some fine high flying on the Henry Farman. Verrier made another flight on the Maurice Farman a little later, ending somewhat sensationally. When somewhere over the Edgware Road, he started one of his pancake glides, lasting until he all but landed in the field just behind the sheds, but he made a glorified hop into the aerodrome, then flew outside again and finally made a sharp *vol plané* over the sheds, apparently jumping off the roof of the tea-garden just outside the aerodrome. This practically finished the day's flying, one or two other flights being made with the Henry Farman.

Sunday was still very windy, but several exhibition flights were got through in the evening by J. L. Hall and Desoutter on their Blériots, Noel and Verrier on the Henry and Maurice Farman machines respectively, whilst Lewis Turner tested the Howard-Wright 'bus which had just come out of hospital.

MR. H. J. D. ASTLEY'S FATAL ACCIDENT.

BRITISH aviation could ill afford to lose the services of such an able and enthusiastic pilot as Mr. H. J. D. Astley, who met his death at the Balmoral Show Grounds, Belfast, last Saturday. So successful had the flights on the previous Saturday proved that arrangements were made with Messrs. Valentine and Astley to repeat them. Mr. Valentine was first up and gave a ten minutes' exhibition on his Deperdussin, after which Mr. Astley ascended, but with no definite intention as to what form his flying would take. In endeavouring to keep within the limits of the oval shaped ground Mr. Astley made some sharp turns, and in one of them apparently the machine side-slipped. The pilot evidently realised that a fall was bound to come, and set to work to keep the machine clear of the mass of spectators. This he succeeded in doing, and the monoplane crashed down inside the track.

Mr. Astley received such injuries to the head through being pitched violently forward from his seat that he died two hours later, despite the endeavours of Professor Sinclair, the eminent surgeon, who happened to witness the fall. At the inquest on Monday the jury, after hearing the evidence of Mr. Harry Delacombe, Manager for Messrs. Astley and Valentine at Belfast, and the medical evidence of Professor Sinclair, returned a verdict of "Accidental Death," adding a rider to the effect that Mr. Astley died in his efforts to save others by getting his machine clear of the spectators. To readers of FLIGHT and of the *Auto*, it is unnecessary to refer in detail to Mr. Astley's career either as an aviator or as a driver of racing cars, in which sport he took great interest previous to taking up aviation, but one of his best performances was his recent attempt for the Pommery Cup when he flew with Miss Trehawke Davies from Paris to Bonn.

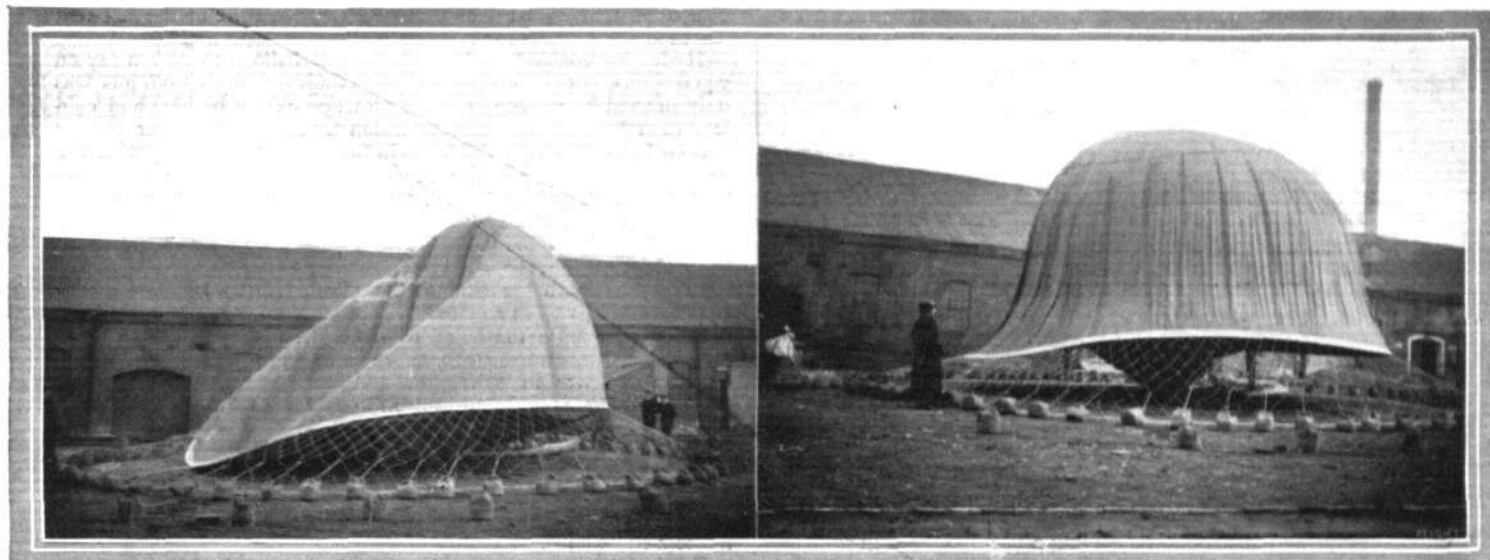
HYDROGEN V. COAL GAS.

By GRIFFITH BREWER.

ONE Saturday during the month of April last an opportunity occurred of testing the comparative merits of hydrogen and coal gas. The "Bee," 18,000 c. ft., which was described in FLIGHT of June 3rd and 10th, 1911, was inflated with hydrogen at Knowles Oxygen Co.'s Works at Wolverhampton, and the "Meteor,"

50 lbs., and the "Meteor" carrying 10 bags of about the same weight.

It had been arranged that the "Meteor" should rise from Dunstall Park as soon as the "Bee" could be seen in the air, and also that immediately the "Bee" started a telephone message should be sent



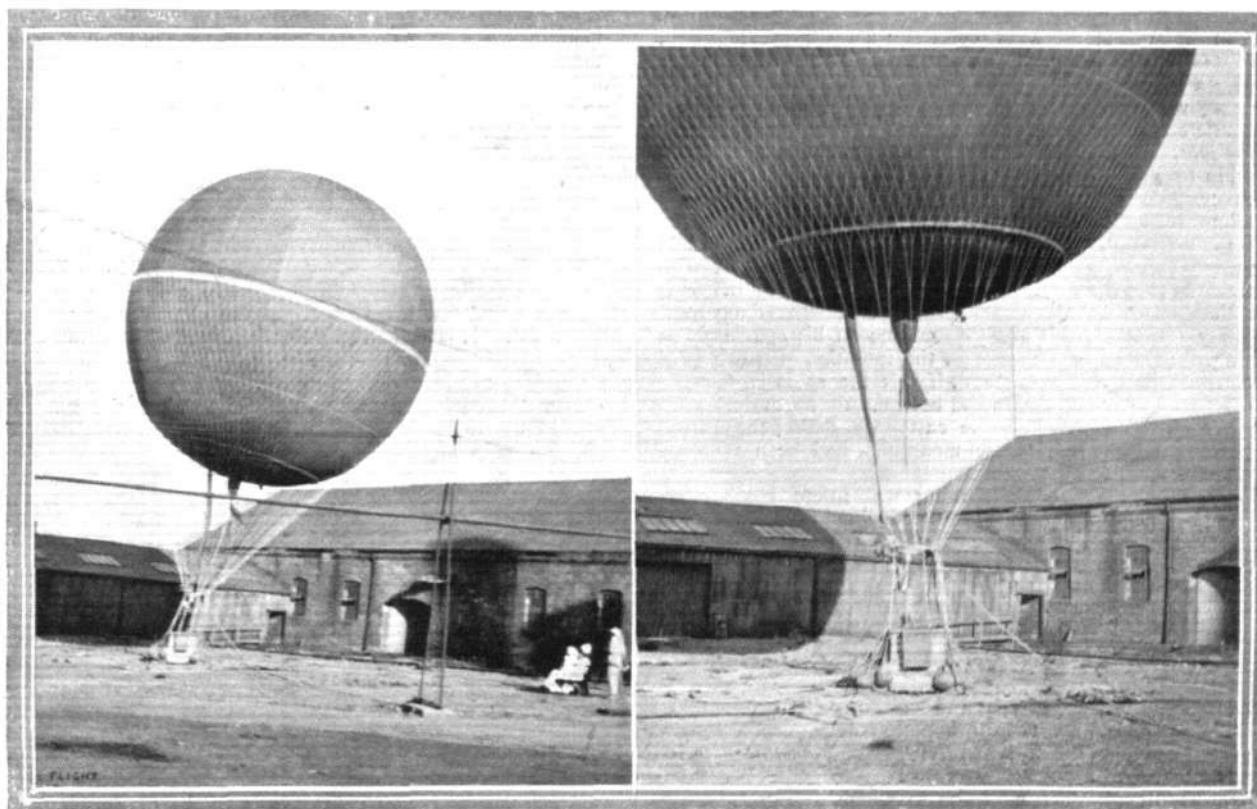
The "Bee" inflating in a wind, which is blowing in one side of the envelope.—On the right, the "Bee" partially full; note the wide band round the equator of the envelope, to which the fringe of net is attached.

50,000 c. ft., was inflated with coal gas at Dunstall Park, Wolverhampton, about a mile and a half distant.

Both balloons carried the same weight in passengers, namely, 21 stone 3 lbs. in each, the Hon. Mrs. Assheton Harbord being with myself in the car of the "Bee," and Count Fitzjames with Mr. Radley in the car of the "Meteor." Both carried about the same weight in ballast, the "Bee" carrying 9½ bags, each weighing

from the Knowles' Works through to Dunstall Park to warn the "Meteor" to be ready.

The start from Knowles' Oxygen Works was rather difficult, owing to a strong easterly wind, and the exposed position of Wolverhampton, which is about 500 ft. above the sea. Consequently the wind rolled the balloon about a good deal, and various eddies and down-draughts were created by the surrounding buildings



The "Bee" inflated: observe the absence of netting on the upper part of the balloon.—On the right, the "Bee" and its car at close quarters; note the absence of a rigid hoop at the mouth of the balloon.

On giving the order to let go, the balloon only rose sluggishly, and then was carried quickly towards the electric power overhead wires, and it was necessary to quickly part with a bag of ballast. The wires cleared, there was still a small gasometer to negotiate, and beyond that, a square chimney of about 80 ft. in height. These three obstacles were cleared successively by a sufficient margin, but the ascent was evidently not lacking in interest, because those in charge of the telephonic communications did not advise Dunstall Park, and the first intimation received by the "Meteor" was by seeing the "Bee" in the air. Mr. Radley got away very smartly, however, and both balloons were soon getting out of Wolverhampton at a height of about 3,000 ft.

It is my custom when ballooning, to start a stop-watch on leaving the ground, and count time by the stop watch and mark the time off on the map, ruling a bold line showing the course followed. Whenever a place is identified on the map below, the time is taken from the stop-watch and the distance measured, and this gives an accurate indication of the speed at which the balloon is travelling.

Wolverhampton is beautifully situated, adjacent to the open country, and when travelling towards the west, the manufacturing district is left behind almost immediately. One has only to travel five or six miles in this direction in order to get into the most rural country with a very large proportion of grass land.

Having started so late, *i.e.*, 6.35 p.m., we were anxious to find a good temporary landing place for the night, and so when we came to the Severn Valley and saw the little town of Bridgnorth below, we opened the valve and found a very sheltered spot in a grass field behind a row of trees where the air was perfectly calm. We threw the grapnel, and then a countryman coming up, got him to hold on to the basket. Soon there were many others on the ground, and we set some to work to fill two sacks with earth and to bring some barrows full of bricks to weigh down the car to enable us to get out.

The "Meteor" which had been following had been manoeuvred very skilfully, and seemed to be making a bee-line for us in spite of her having started more than one mile to the north. So accurately did Radley gauge the currents, that he brought his balloon down with his car in the field beyond us and his trail rope in our own field, so it was quite an easy process to lift him over the fence and then have both balloons alongside each other.

Having weighted both balloons down to our satisfaction, and tied ropes to stakes in the ground, we left two watchmen in charge, and went into Bridgnorth to dinner. It was then arranged that the pilots should keep watch in a cottage close to the balloons, and the passengers should get a few hours' rest at the Bridgnorth Hotel before re-starting in the balloons next morning at 5 o'clock. The object of so early a start was to avoid the strong wind which usually springs up at sunrise. As a matter of fact, however, the dying down of the wind at night is usually very superficial, and generally at a height of 200 ft. or so the same strong wind blows as it blew the previous day, and so it was in this locality. An absolute calm existed on the ground with a bright star-light night, and when at five o'clock the next morning we again started, the full wind of 25 miles per hour was encountered before the trail-rope was off the ground. We found, however, that the wind had changed in direction during the night, and instead of the course continuing due west, it merged into a south-westerly direction, and afterwards became more southerly. I have an impression, however, that this change in direction was due mainly to the formation of the ground, the easterly wind being held back by the Welsh mountains, and being diverted from east with a little north in it into a north wind with a little east in it. It is probable that winds of this character are somewhat dangerous, because they tempt a balloonist to continue on his course when approaching the South of Wales with the intention of crossing the Bristol Channel into Somerset; and, if this theory is correct, he would find that the wind, which had been mostly north during his travel in Wales, would become due east on reaching the Bristol Channel, seeing that the barricade of mountains had been removed by the open Channel.

The journey on the Sunday morning was interesting for the reason that no ballast was used by either balloon from the time of starting from Bridgnorth to the time of landing two-and-a-half hours later in the neighbourhood of Abergavenny, this being a further run of about sixty miles. We landed in the parish of Llangattock, in a

bend of the River Usk, four miles beyond Abergavenny, and although we landed behind the shelter of a row of trees, there was sufficient wind on the ground to make the anchor drag through the grass, and to force us to use the rip panel, which I always do reluctantly, preferring to use the valve in order to let the hydrogen escape.

Comparing notes afterwards with Mr. Radley, I found that his experience confirmed my previous impressions on the advantage of a small balloon with hydrogen over a large balloon with coal gas.

The "Bee" ended up her experience with 6½ bags of ballast, as compared with 4½ bags of the "Meteor," in spite of the fact that her capacity was less than one half.

Hydrogen enabled us with this small balloon to start away on equal terms, but with the tremendous advantage that our gas was only affected by expansion and contraction caused by heat and cold less than half that of the expansion and contraction for similar reasons in the "Meteor." Thus in the morning, starting with the gas contracted, we parted with only one bag of ballast less than we landed with the night before, whereas the "Meteor" must have parted with several bags in order to get away, seeing that neither the "Meteor" nor the "Bee" used any ballast during the morning.

The amount of gas wasted after starting owing to expansion had nothing to do with the skill of the piloting, but was solely due to the fact that, given an equal rise in temperature, 50,000 c. ft. of gas must expand more than the 18,000 c. ft., and the gas and sand wasted for this cause must therefore be in proportion.

This difference in expansion and contraction owing to the quantity of gas, is sufficient in itself to explain the difference in the quantity of ballast used in these two balloons, and points to the fact that given similar conditions, the 18,000 c. ft. hydrogen balloon would have a longer sustaining power than the 50,000 c. ft. coal gas balloon. It is obvious also that the descents and ascents are easier to manage with a balloon of so much smaller surface, as the wind has less effect on it.

Coming back in the train, a further advantage was readily recognised, not only by ourselves but by all the porters at the different railway stations, because with the "Bee" they had less than 4 cwt. to handle, whereas with the "Meteor" they had only a little less than 8 cwt. to handle.

A further advantage of the hydrogen balloon should not be overlooked, and that is that the "Bee" cost about one half the initial cost of the "Meteor," due solely to the smallness in size, and not to any less perfect material.

On the merits of having no net over the top of the balloon, but attaching the net to a band round the equator, I have already extolled, and also on the fact of there being no rigid hoop at the mouth of the balloon. In the "Meteor" this latter improvement has been adopted. These two advantages dispense with two operations, one of removing the net, and the other of removing the hoop at the mouth, and the difference in the number of operations on landing is clearly a considerable advantage, especially in packing up before an inconveniently large crowd has had time to collect, and in getting off the land before any damage has been done.

The only disadvantage of the hydrogen balloon is the expense of the hydrogen, but as hydrogen can be obtained at the Knowles' Oxygen Company at 5s. per 1,000 c. ft., it is worth taking a balloon there to fill at the reasonable price of £4 10s., especially when one remembers that Wolverhampton can be reached in 2½ hours by either the Great Western or the North Western, and that in ascending from Wolverhampton a London balloonist has quite a new experience so far as the character or the country is concerned. It is also an enormous advantage to get out of the town quickly, and to know that one has gone up almost in the centre of England with plenty of land to alight on in every direction.

It had been feared at the time of building the "Bee" that it would only be possible to inflate it in very calm weather. This last inflation in a high wind is, therefore, very satisfactory, because it shows that no harm will come to the balloon during the initial stages of inflation owing to the upper hemisphere being uncontrolled. The effect of wind is simply to blow one side in, and the valve is not knocked about on the ground as we feared it might be in a wind, but rises gradually in spite of the fabric being blown about somewhat roughly.

To FLIGHT: an Acrostical Lament upon a few Numbers going Astray.

FLIGHT, dear, we have missed you, and look for you in vain.
Lost to mem'ry, dear old sport—still, hope to meet again.
I loved to read you every week, when living in Raynes Park.
Great deeds, as chronicled by you, brightened my hours dark. [roam,
Hail! Great FLIGHT. When next you soar, cros't pastures swiftly
Tulse Hill shall be your hangar, and eighty-eight your home.

PHIL RAY.

Fame, indeed!

COL. S. F. CODY has now been added to the rapidly increasing collection of portrait models of famous aviators with miniatures of their machines which is to be seen at Madame Tussaud's exhibition in the Marylebone Road. The winner of the chief prizes in the recent Army Aeroplane Trials is just now one of the most popular exhibits, but he is run close by the figures of President Taft, ex-President Roosevelt, the late General Booth, and the new leader of the Salvation Army.

NEGATIVE PRESSURE ON WINGS.

As is evident from a letter that we publish this week relating to Eiffel's Pressure Distribution Curves, there is nothing like a good diagram to bring home to the mind a principle that leaves a reader almost entirely unaffected when expressed in words. Almost from the day FLIGHT was founded we have pursued an elementary theory of the aerodynamics of the aeroplane based on the simple hypothesis that "the machine is supported in flight by the inertia of the air." The very first deduction from this starting point leads to the necessity of defining the mass of air that the wing in its flight causes to be in simultaneous downward acceleration. The evidence of experimenters from the Wright Brothers onward has afforded convincing proof that part of the said mass is unquestionably located *above* the wing. In other words, the wing of an aeroplane is not supported merely by the air that is positively deflected by its underside. Its motion through the air deflects downwards a stratum of the atmosphere, the effective depth of which is partly above and partly beneath the wing.

This much has been known for a long time and anyone who has stopped to think about it must surely have asked himself the question, how does the top side of the stratum communicate lifting force to the wing? Obviously, it can only do so by virtue of its existence in a state of negative pressure, that is to say, the region above the wing exerts a "suction." This latter term is apt, however, to convey, a medley of curious ideas to many minds; it is not easy to give quite the impression that one might wish with regard to the nature of this negative pressure region. One simile that is sometimes helpful is to imagine the upper side of the wing to be covered with a sheet of material that is stuck to its surface. In order to remove the material it will be necessary to pull upon it, which will place all its strands in tension and also exert a tension upon the wing itself. If the material is of several layers in thickness the stress will be communicated from layer to layer. In some such way as this it is, perhaps, possible to get a materialised picture of the air above the wing and to crystallise in the mind an idea of negative pressure and its manner of exerting a lift.

The important point in this connection is that there is no need to assume the assistance of vortices, or any other peculiar phenomena, any more than there is to assume that our imaginary piece of material must have rucks in it. The purpose of a wing, according to the hypothesis, is to deflect a stratum of air, and the less disturbance it causes when doing so the higher is the potential efficiency of its action. Such experimental evidence as exists shows that the lower surface of the wing causes the air stream to follow its own contour, but that the upper surface fails in this respect. The general character of the flow over the upper surface is, in fact, one in which the air stream breaks away from the contour of the wing surface and forms rollers or vortices above it. When the attitude of the wing assumes a large angle of incidence, then the region behind the wing in the vicinity of the upper surface becomes "dead water."

In any case, the region above the wing is a region of negative pressure, and would be a region of negative pressure just the same if the upper part of the stratum evenly followed the contour of the upper surface of the wing. Wherever there is tension in the fluid, and tension is obviously required in order to lift the wing from above, the stress in the air must cause negative pressure. But—and this seems to be a point on which the minds of so many students diverge from the logical sequence of the argument that is based on our fundamental hypothesis—the existence of a negative pressure or otherwise does not affect the main fact that the total lift results *solely* from the acceleration of the mass of air deflected.

The simplest case for which to work out the problem is, obviously, one in which the wing is assumed to deflect a stratum of fluid of strictly uniform density and viscosity and having a well-defined boundary. Such a state of things does not, as everyone knows, actually exist, but whatever the modifications may be, however vague may be the "sweep" or depth of the stratum, for example, there must always be some equivalent depth of our hypothetical stratum that would produce the same result. In the same way, it is possible to analyse the question of deflection; the air does not actually follow the precise contour of the wing, but still there must be some equivalent angle of deflection that would produce the same result were our hypothetical stream to flow uniformly through it under the assumed conditions.

These equivalent conditions are true and justifiable so long as the hypothesis that an aeroplane is supported in flight by the inertia of the air holds good. By keeping that hypothesis steadily in view the whole problem must in the end be confined solely to an expression of mass and acceleration. Intermediate stages concerned with the nature of the flow and the pressure distributions are digressions for the purpose of increasing the particular knowledge relating to certain aspects of the subject, in order that the assumptions necessarily

made at many stages of the main argument may be less wide of the mark.

Thus, the fact that Eiffel's pressure distribution curves show a negative pressure, should occasion no surprise; but as an indication of the detail character of the pressure distribution they are invaluable, always assuming, of course, that they are accurate. Accurate or not in the strict sense of the term, however, there is no doubt whatever that Eiffel's pressure distribution curves are of the greatest possible value in helping students to fix their ideas, in giving them a basis on which to work out specific examples and in indicating in an unmistakable way certain general principles that, being common to all the experiments, are likely to remain true, even should subsequent research tend to modify some of the details of Eiffel's work. It was to these broad principles that Mr. Handley Page mainly confined his attention on the occasion of the Aeronautical Society's meeting and for which work many students must remain indebted to his aid, for Eiffel's book "*La Resistance de l'Air*" is, as yet, only available in the original French, and we are unaware of any effort that is being made to translate it, although we are of the opinion that at the present time there does not exist a book better worth translating if only it is done quickly.



The beautiful memorial window placed in the church at Eastchurch to commemorate the late Hon. Charles S. Rolls and the late Mr. Cecil Grace.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

The British Empire Michelin Cup No. 1.

(Under the Competition Rules of the Royal Aero Club.)

The Michelin Tyre Company has presented to the Royal Aero Club of the United Kingdom, for competition by British aviators, a trophy of the total value of £500.

Annually, for five years, a replica of this trophy, together with a sum of £500 in cash, will be given to the successful competitor. This trophy will be competed for under the following conditions, which shall apply for this year only:—

CONDITIONS.

1. The winner for the year 1912 shall be the competitor who, on or before October 31st, 1912, shall have remained the longest time in the air on an aeroplane in one flight without touching the ground. The flights may only be made between the hours of sunrise and one hour after sunset, and in order to qualify for the prize the competitor must make a continuous flight of at least five hours.
2. Competitors may use any recognised flying ground in the British Isles, and all attempts must be made in the presence of the official or officials appointed by the Royal Aero Club.
3. Competitors desiring to leave the precincts of the flying ground during the flight must carry a barograph set and sealed by the officials prior to the start.
4. The time will be reckoned from the moment of crossing over the starting line in actual flight to the moment of alighting. The landing must be in sight of the official or officials.
5. The entrant, who must be the person operating the machine, must be a British subject, flying on a British-made aeroplane, must hold an Aviator's Certificate, and must be duly entered on the Competitor's Register of the Royal Aero Club.
6. The complete machine, and all its parts, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material.
7. An entrance fee of £1 must accompany every notification of an attempt, and at least three clear days' notice must be given to the Secretary, Royal Aero Club, 166, Piccadilly, London, W. A competitor must further deposit a sum of £10 on account of expenses, if any, of officials. Any balance not so expended will be returned to the competitor.
8. Should any questions arise at any time after the date of entry as to whether a competitor has properly filled the above conditions, or should any other question arise in relation to them, the decision of the Royal Aero Club shall be final and without appeal.
9. A competitor by entering waives any right of action against the Royal Aero Club or the Michelin Tyre Co. for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Michelin Tyre Co., or their representatives or servants, or any fellow competitor.
10. The aeroplane shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself or his aeroplane, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the Michelin Tyre Co. in respect thereof.
11. The Royal Aero Club reserves itself the right to add to, amend, or omit any of these rules should it think fit.

British Empire Michelin Cup, No. 2, £600.

(Under the Competition Rules of the Royal Aero Club.)

The Michelin Tyre Company has presented to the Royal Aero Club of the United Kingdom for competition by British aviators, the sum of £600, to which will be added a trophy to be retained by the winner.

The following are the rules governing the competition for the year 1912:—

1. The winner for the year 1912 shall be the competitor who, on October 15th, 1912, shall have completed a prescribed circuit of about 186 miles on an aeroplane in flight in the fastest time, reckoned in miles per hour.
2. Competitors may select their own circuit of about 186 miles, but the start must be made from a flying ground approved by the Royal Aero Club, and the proposed circuit must be submitted to the Royal Aero Club before the flight is made.
3. The complete circuit must be accomplished without alighting.
4. The flight must be observed at each point named in the circuit by officials appointed by the Royal Aero Club.
5. A number must be prominently displayed on the aeroplane in places approved by the officials, and when flying round each of the points selected in the circuit, the aviator must fly sufficiently low so that his number may be easily verified by the official observer.
6. The circuit must be completed between the hours of sunrise and sunset, on any one day.
7. The entrant, who must be the person operating the machine, must be a British subject, flying on a British-made aeroplane, must hold an Aviator's Certificate, and must be duly entered on the Competitor's Register of the Royal Aero Club.
8. The complete machine, and its parts, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material.
9. An entrance fee of £1 must accompany every notification of an attempt, and at least three clear days' notice must be given to the Secretary, Royal Aero Club, 166, Piccadilly, London, W. A competitor must further deposit a sum of £10 on account of expenses, if any, of observers. Any balance not so expended will be returned to the competitor.
10. Should any questions arise at any time after the date of entry as to whether a competitor has properly filled the above conditions, or should any other question arise in relation to them, the decision of the Royal Aero Club shall be final and without appeal.
11. A competitor by entering waives any right of action against the Royal Aero Club or the Michelin Tyre Co. for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Michelin Tyre Co., or their representatives or servants, or any fellow competitor.
12. The aeroplane shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself or his aeroplane, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the Michelin Tyre Co. in respect thereof.
13. The Royal Aero Club reserves itself the right to add to, amend, or omit any of these rules should it think fit.

The following courses may be used for this competition:—

Brooklands.	Laffans Plain.
Larkhill.	Newhaven.
Newhaven.	Larkhill.
Brooklands.	Upavon.
	Laffans Plain.

The Accident at Belfast.

The news of the sad accident to Mr. H. J. D. Astley at Belfast was received at the Club with great sorrow.

The funeral took place at Elsborough Church, Butlers Cross, near Tring, on Thursday last, and the Club was represented by Mr. Frank K. McClean, and Mr. H. E. Perrin, the Secretary.

Among the many floral tributes were wreaths from the members of the Royal Aero Club and the Aero Club of Ireland.

166, Piccadilly.

HAROLD E. PERRIN, Secretary.

ROYAL FLYING CORPS.

THE following appointments were notified in the *London Gazette* of the 20th inst.:—

Royal Flying Corps.—Col. (temporary Brig.-Gen.) David Henderson, C.B., D.S.O., Director of Military Training, is appointed to the Reserve. Dated September 21st, 1912.

Special Reserve of Officers, Royal Flying Corps. Military Wing.—Second Lieut. (on probation) Charles G. Bell is confirmed in his rank.

Collyns Price Pizey to be Second Lieut. (on probation). Dated September 21st, 1912.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Ground.

LITTLE work has been done during the week, the majority of pilots being away with their machines on manoeuvres. Lieut. Parke has been out on the Short monoplane every day except Saturday, when it was too windy. Lieut. Hewlett has been out daily on 88 with Lieuts. Berne and Courtney as passengers in turn, also Gunner Bobbett.

On Wednesday Lieut. Hewlett, with Lieut. Berne as passenger, started for Chatham in the early morning, but they were obliged to descend on account of induction pipe becoming frozen and stopping engine. This soon cured itself on stopping, when they put back to Eastchurch. On Friday morning about 7 Captain Gordon with T 5, Lieut. Grey with 70 Deperdussin monoplane, Lieut. L'Estrange Malone with 100-h.p. Triple Tractor, arrived back from Hardwicke, having had good flights home. On Saturday Mr. Alec Ogilvie took N.E.C.-engined Wright to Leysdown for more water trials, but owing to increasing wind and heavy seas work had to be abandoned. The machine suffered slight damage to lower plane ribs through the breaking waves. A new Short twin 70 Gnome monoplane appeared, but did not fly on account of windy. The engines are fore and aft the pilot. Further details will no doubt be published when the machine has undergone her tests.

Brooklands Aerodrome.

MONDAY of last week there was quite a lot of flying done, all schools taking advantage of a very calm air. The Vickers machines were all out directly it was daylight also the Bristol's were out as usual, when weather conditions are good. Messrs. Merriam and Bendall were testing and taking up between them Capt. Reid and Gibbon and Mr. Hall for tuition. Lieut. Stopford took his R.Ae.C. *brevet* splendidly and landing well. Capt. MacDonnell, Lieuts. Gaskell and Glanville were all flying figures of 8. Lieut. Hanlon Mr. "Darracq" were doing straights and circuits. Monday evening all pupils out as in the morning with Mr. Payze, in addition, who was making very good straight flights and landing well, Mr. Merriam winding up the work with a neat spiral. At Hanriot School Mr. Sippe and Mr. Sabelli out for many flights in afternoon and evening.

Tuesday morning at 5.15 a.m. at the Bristol School, Mr. Merriam first out trying conditions, Mr. Bendall following on another machine then both instructors up with several pupils. Pupils flying alone were Capt. MacDonnell, Lieuts. Hanlon, Gaskell and Glanville and Mr. Payze.

In the evening Mr. Bendall up testing the air, then took Capt. Gibbon and Reid up for lessons.

Mr. Merriam trying solo machine and then handed machine over to Capt. MacDonnell for a solo afterwards, Lieuts. Penn Gaskell, Glanville and Hanlon, Mr. Payze and Mr. "Darracq" following suit.

No flying Wednesday morning owing to strong winds. In the evening Mr. Raynham, on the Howard-Flanders monoplane, arrived from Farnborough in a very strong wind which surprised everyone present. About half an hour later the wind had dropped a little so out came the Vickers, the Bristols, Sopwith and others, for about an hour's flying. Mr. Merriam was seen out first as he generally is, Mr. Bendall following on another machine, then both taking passengers for tuition, and several pupils flying alone. Mr. Sopwith brought out his new 50-h.p. Gnome tractor biplane and flew two circuits.

Thursday morning at the Bristol school Mr. Merriam, at 5.30 a.m., testing, then up behind Capt. Reid for tuition. Mr. Bendall testing another machine, then sent Lieut. Hanlon on straights. The wind then got up; no further work. Friday all day windy.

Saturday morning, Mr. Merriam testing the air, then took up in front Capt. Gibbon and Reid; afterwards Mr. Bendall gave these pupils tuition on the biplane. Mr. Merriam trying solo machine, then sent Lieut. Glanville for his *brevet* who made a most excellent flight and landing well. Lieut. Penn Gaskell then took half of his *brevet* in good style, but could not continue his other half owing to the intensely cold weather. Capt. MacDonnell and Miller, Lieut. Hanlon, and Mr. Payze flying solos.

Sunday morning, Mr. Bendall and Mr. Merriam and pupils out. Lieut. Penn Gaskell took his other half of *brevet* splendidly. Hanriot monoplane—Mr. Sippe out first doing very steep banked turns, flying very gracefully, Mr. Sabelli out flying in usual excellent style, too. Then Mr. Ducrocq on the Hanriot school biplane with new Rossel-Peugeot engine followed by his mechanic Allcock doing straights on same machine, flying and landing nicely. In the afternoon Mr. Gordon Bell, with passenger, on the Army B 2, arrived from Farnborough in a bad wind indeed, after an hour's stay returned. The machine appeared to be rolling about considerably and must have had a rough time going back. No flying by anyone owing to the weather being so terribly bad.

At the Hanriot School, Sippe was out Monday on the monoplane, and Ducrocq on the biplane, and next day both Sippe and

Sabelli were in the air on the Hanriot over Weybridge and surrounding country, whilst Ducrocq was flying splendidly for an hour with the Hanriot school biplane, the Rossel-Peugeot motor giving splendid results.

Vickers School.—Tuesday morning, last week, early, Captain Wood took out No. 5 machine testing the new engine which seemed to be giving satisfaction. In the evening Mr. Knight flew the machine for several wide circuits at a good height and then turned it over to Mr. Barnwell who put up a nice short flight of about a quarter of an hour. Mr. Geere then went up for several circuits flying extremely well for a beginner. He seems to have a nice control of the machine in the air and is fit for his *brevet* whenever he elects to take it. In the evening, on Wednesday, Mr. Knight had out No. 5 as usual, flying for a short time and then relinquished the machine to Mr. Barnwell and Mr. Geere who were flying till dark. Mr. MacDonald was also out on No. 6.

Thursday was too windy for pupils, but Mr. Knight was out in the morning on No. 5 for about 20 mins.

Early Friday morning Mr. Barnwell and Mr. Geere were putting in good practice on No. 5, flying over the surrounding country, and next day Mr. Knight on the Vickers-Farman took up Capt. Stott and other pupils for instruction. Mr. MacDonald was also out for a short time on No. 6.

Mr. Knight on Sunday morning was on No. 5, after which Mr. Barnwell put in some practice at a good height. Mr. Geere then took the machine and passed the first half of his *brevet* tests, flying in good style, while Mr. Knight was instructing Capt. Stott on the Farman. Mr. MacDonald went off on No. 6 with Capt. Beatty as passenger, but owing to plug trouble landed on the golf links. After adjustment they flew back to the aerodrome.

Fog on Monday morning stopped work, but in the evening Mr. Knight and Mr. Barnwell were out for some time on No. 5, and next day Mr. Geere on No. 5 passed the remainder of his *brevet*, flying well and avoiding with some skill other machines which were flying round. Capt. Wood out for several trips on the Farman with Capt. Stott. Later on Mr. Knight was doing straights getting his hand in on No. 6.

Eastbourne Aerodrome.

VERY little school work has been possible during the past week, owing to the persistence of an easterly breeze, which refused to moderate until nearly dark and was up again at sunrise. Mr. Lerwill managed to get in a little practice on Wednesday morning and on Thursday afternoon, in spite of a strong breeze,



"Flight" Copyright.

Mrs. Stocks just about to start for a flight on her Blériot monoplane at the Hendon Aerodrome.

Mr. Hammond made a very pretty solo. Later on he tried to take up a lady passenger, but was obliged to come down owing to the wind.

Friday, Saturday, Sunday and Monday were all blank days. Tuesday morning saw Messrs. Gassler and Foggin out on 28-h.p. Blériot. Mr. Foggin started for a circuit, but on getting up to about 100 ft. he commenced a series of most alarming evolutions, which ended in a spiral dive. The machine struck the ground almost vertically and was smashed to pieces. Mr. Foggin had a marvellous escape. His helmet undoubtedly saved him from serious injury, as on examination several nasty cuts were discovered in the leather. Lieut. Minchin and Mr. Roberts have put in a good deal of time in the workshop, helping to dismantle one of the Gnomes and generally making themselves useful.

Freshfield, Lancs.

THURSDAY, last week, after calling at Waterloo for the purpose of seeing Mr. Melly's pupils try for their *brevets*, which after a few short trials the conditions were considered unfavourable, Mr. Higginbotham went on to Freshfield, and had about a 4-mile flight, landing because of darkness. This was a great disappointment as the conditions were ideal. Next morning he had about an hour's flying to Ainsdale and back several times, and incidentally made an interesting test with a 2-ft. level pivoted to the engine-bearer, and fitted with a simple locking device so as to set same when the machine was in flight; after taking machine into hangar was thus able to see the exact angle of the planes in flight.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—School out at 6 a.m. Monday, last week, under the instruction of Mr. Lewis Turner. Capt. Kunhardt, Lieuts. Allen and Small, and Messrs. Wilson and Marrick doing straights on Sommer biplane. Mr. Hoelscher circuits on same machine. Mr. Roupell circuits on 35-h.p. Blériot, and Major Madocks passenger flights with instructor.

In evening Mrs. Stocks out on 25-h.p. Blériot. Mr. Tone Bayetto rolling on same machine. Major Liles and Lieut. Allen and Messrs. Fuller and Wilson straights on No. 7 biplane.

School out at 3 p.m. next day. Capt. Kunhardt, Lieut. Allen, and Messrs. Fuller and Wilson, straights on No. 7 biplane, Messrs. Hoelscher and Wynne circuits on same machine. Wednesday, Mr. Fowler straight flights on 25-h.p. Blériot.



"Flight" Copyright.
The tallest aviator in the world, Eugene Galy, the new pilot of the little Caudron at Hendon.

Friday, pupils at 6 p.m., under instruction of Mr. Blackburn, Capt. Halahan, Lieut. Allen and Mr. Wilson doing straight flights on No. 7 biplane, and Mr. Clark (new pupil) having passenger flights. Capt. Kunhardt, Lieut. Allen, and Messrs. Wilson and Fuller straight flights Saturday, on No. 7 biplane. Major Madocks and Mr. Clark passenger flights on same machine. Mr. Fowler rolling on 25-h.p. Blériot. Sunday, at the school, Lieut. Small and Mr. Wilson straights on No. 7 biplane. Mr. Wynne doing circuits on same machine. Major Madocks rolling. Owing to the very high wind flying did not commence until the early evening, when some exceptionally fine exhibition flights were given by the following well-known aviators, at one time there being five machines in the air at once: M. Desoutter on 35-h.p. Blériot, Mr. Lewis Turner on Howard-Wright machine, M. Pierre Verrier, Mr. Noel carrying passengers, and Mr. Pickles making some fine flights on the Caudron. During the evening Lieut. Fox left with his observer on the Army machine for Brooklands.

Blackburn School.—Monday last week, Spink, Buss and Dr. Christie doing rolling practice in the morning for the first time. Again from five to seven in the afternoon the same three pupils doing further rolling practice. Dr. Christie causing some slight excitement on his last journey, failing to switch off the engine he came back with too great a speed and then rose into the air, with the consequence that he ran right into the hangar. The doors were fortunately open, and therefore, only slight damage was done to one of the wing tips striking the side. Next day wind too high for practice, pupils getting familiar to control in hangar. Wednesday morning early Buss and Glew out rolling, and on Saturday and Sunday, Buss, Spink, and Glew again out doing rolling practice in early morning.

Blériot School.—Many pupils out practising and taking advantage of occasional lulls in the wind. Monday last week Messrs. Gandillon, Reilly, Teulade, Sacchi and Clappen all putting in good spells of work on LB 1 and LB 2.

Messrs. Teulade, Sacchi, Clappen, Reilly and Gandillon all working well next day, the former being now almost ready to attempt his *brevet* tests. Messrs. Reilly and Gratun out early Wednesday on LB 1 and making good progress.

Thursday Mr. J. Lawrence Hall, an old pupil of the school, was flying his 50-h.p. Gnome-Blériot in about 25 m.p.h. wind, and demonstrated that he has very good control over his machine, the engine of which, at that time, was not pulling as well as it might have been.

British Deperdussin School.—Wednesday, last week, Lieut. Tucker and Mr. Spratt practising straights on taxi No. 2, both making excellent progress. Lieuts. Mapplebeck, Whitehouse and Durand putting in good work rolling on taxi No. 2. In the evening there was no school work, the wind was too high.

Thursday and Friday no school work was possible owing to unfavourable weather.

W. H. Ewen School.—On Monday last week the pupils were out at 5.30 a.m. and an excellent and almost continuous day's work was put in. Under the instruction of M. Baumann Lieuts. Bayly and McMullen were making splendid progress on monoplane No. 1, doing straight flights at 25-30 ft. and showing good judgment in landing. Mr. L. Russell on same machine making improved rolls. Capt. Chamier and Mr. H. H. James on monoplane No. 2 were flying straights and half circuits in fine style and landing nicely. At 9 a.m. Mr. Sydney Pickles brought out the 35 Caudron biplane, and after a short test flight handed the machine over to Messrs. Apar and J. H. James who, thereafter, had three and a half hours' continuous practice. After each had eight flights Mr. Sydney Pickles made a short flight, and finding everything satisfactory in the air, Messrs. Apar and J. H. James continued their practice and each made another eight flights, both showing excellent progress. At 4 p.m. all the pupils were out again when M. Baumann had Lieuts. McMullen and Bayly making nice flights and Messrs. Lawford and L. Russell hopping, Capt. Chamier and Messrs. H. James, Warren and Gist each making several flights on monoplane No. 2. At 5 Mr. Sydney Pickles was again out on the 35 Caudron and rising quickly to 1,000 ft. made a beautiful *vol plané* down Collindale Avenue. He immediately went up again taking a sealed barograph and in a flight of 30 mins. attained an altitude of 3,500 ft. in the course of which he passed over Cricklewood and the surrounding country and was lost in the mist for fully 10 mins. Returning to the aerodrome he executed a spiral *vol plané* making three complete circuits in the third of which his propeller became stationary at a height of 150 ft. Mr. D. Edmund then flew several circuits on the same machine and would have gone for his *brevet* tests but for the quickly rising mist.

On Tuesday morning school work started at 6 a.m., when Capt. Chamier, Lieuts. Bayly and McMullen, and Mr. Lawford put in some excellent practice on monoplanes 1 and 2 before the wind rose. School out again in the evening, and some real good work put in by Messrs. Lawford and Gist on monoplane 1, and Capt. Chamier and Messrs. H. James and W. Warren on monoplane No. 2. Mr.

Sydney Pickles was on the 35 Caudron, giving a nice exhibition, after which he gave a passenger flight to Mr. J. H. James, on the same machine, flying several circuits comfortably at a height of 200 ft.

The pupils started practice at 7 a.m. on Wednesday as soon as the mist lifted. Mr. Sydney Pickles made a test flight of several circuits on the 35-h.p. Caudron taking Mr. Apcar as passenger. Machine then handed over to Mr. Apcar for solo practice who, after two good straights, made his first circuit at 100 ft. in excellent style. Mr. Edmund then made two flights in the Caudron doing some splendid figure 8 flying. Mr. J. H. James next out on same machine doing circuits. This young pupil is showing wonderful aptitude, and impresses one with the manner in which he controls the Caudron even in some wind. M. Baumann was busy with pupils on monoplanes 1 and 2 and Capt. Chamier, Lieut. Eric Conran and Mr. H. James were making some nice flights. In the evening there was a stiff breeze but Mr. Pickles was out giving a fine exhibition on the 35-h.p. Caudron for the benefit of some interested spectators.

Mr. Pickles put up a good exhibition flight on Thursday evening, but there was too much wind for any school solo work as also was the case on the following day.

On Saturday the pupils were out at 5.30 a.m. taking full advantage of the beautiful early morning spell. Lieut. Eric Conran made splendid progress on monoplane No. 1, flying straights at 30 ft. and landing well, while Mr. L. Russell hopped from the rolling stage. Capt. Chamier, and Messrs. H. Gist and H. James on No. 2 monoplane were making fine straights and half circuits, and showing considerable improvement in landings. Mr. Sydney Pickles after a short test flight handed the 35 Caudron to Mr. Apcar, who put in six very good straight flights. Mr. J. H. James then made an excellent flight of three circuits at 150 ft., after which he landed nicely. Mr. Sydney Pickles thereafter took up Messrs. Gist, Apcar and J. H. James for air instruction, after which he gave an extended passenger

flight to Mr. S. Freshney. Rising to over 300 ft. he circled the surrounding country and finished with a semi-spiral *vol plané*.

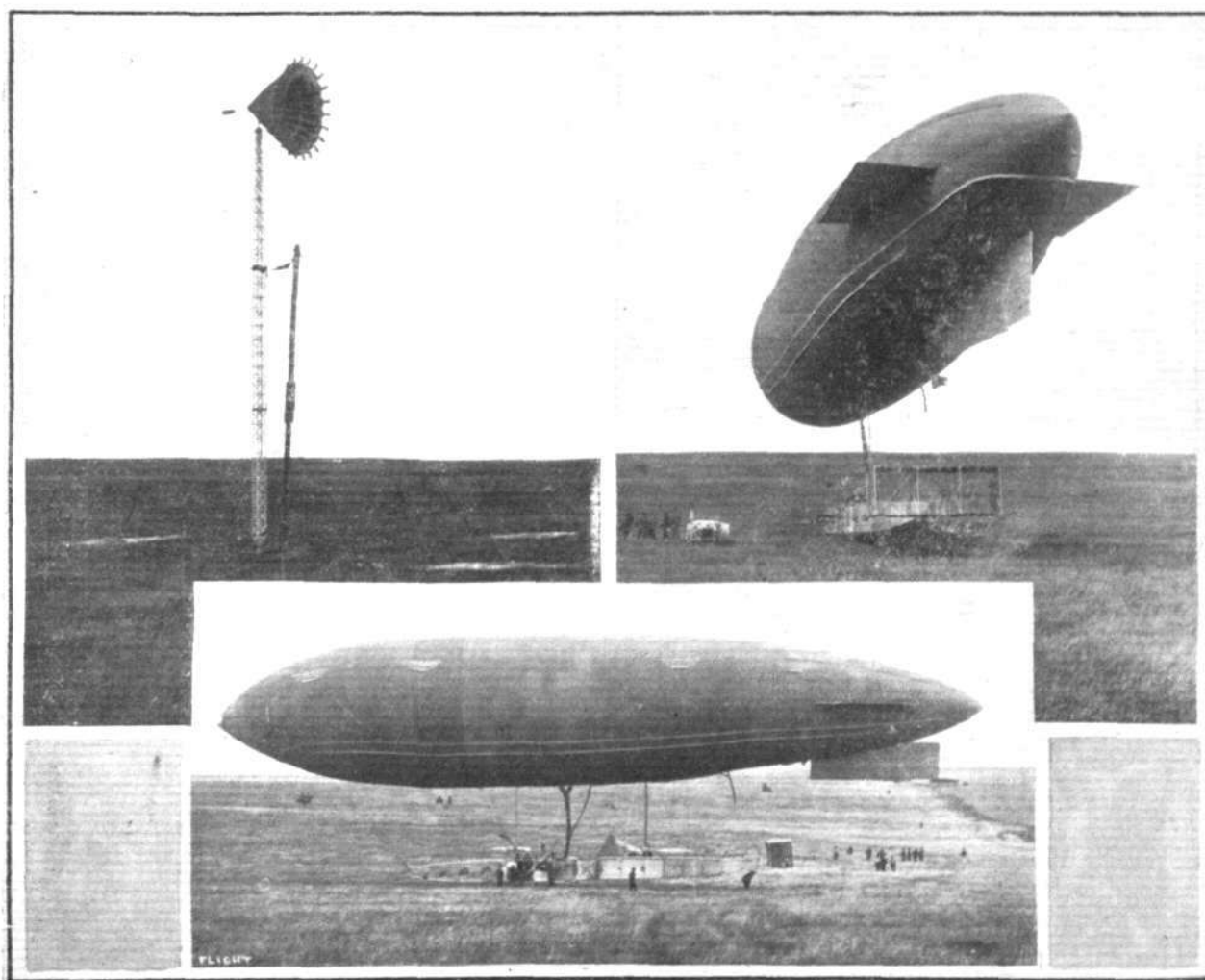
The pupils were out at 6.30 on Sunday, but the wind continued too strong for school practice. Mr. Sydney Pickles, however, after a test flight, gave passenger flights to Messrs. J. H. James and H. James, and others, including Mr. Keith Davies, one of the early pilots of Brooklands.

Salisbury Plain.

Bristol School.—Mr. Pizey was first out on Monday morning last week for a trial flight, after which school work was very brisk. Pizey and Harrison giving tuition flights to all pupils, making in all thirty flights, the wind was too strong to permit of solo flying.

Harrison on monoplane in the afternoon, Pizey and Harrison giving two tuition flights to Messrs. Lucena, Lywood, Penfold, and Parker, while five other pupils were given flights. Busted was on the school side-by-side monoplane with Prince Cantacuzene, Lieut. Hall, and England as passengers. Busted also testing Bristol monoplane fitted with Anzani engine, Lieut. Hall afterwards making a solo on the same machine.

Instructors and pupils at the hangars early on Tuesday morning, but no flying possible owing to thick Scotch mist. Harrison tested conditions about 11 o'clock, but wind had risen by this time. In the afternoon Harrison made a trial flight with Mr. Lucena as passenger but found weather too bad for school work. Busted out later for another trial, but no improvement. Mr. Pizey went later with Mr. Parker as passenger, and school work was started. Harrison was busy giving tuition to Messrs. Lucena, Lywood, Parker and four officers. Pizey made a good flight on the school side-by-side monoplane, afterwards taking two officers, Mr. Lucena and Prince Cantacuzene, for a long flight. Busted testing a new monoplane. Petrol supply running out he had to land on ploughed field, from which he again ascended after having his tanks replenished. Harrison brought work to a conclusion by a couple of circuits on a biplane with a pupil as passenger.



The Army Airship "Gamma" pays a visit to Salisbury Plain during the aeroplane competition. One of the pictures shows the very clever portable mooring-mast, designed by the R.A.F., to which the nose of the airship is attached when the dirigible is anchored.

"Flight" Copyright.

Jullerot was first out, Wednesday morning, Pizey ascending with Prince Cantacuzene for two long tuition flights on the side-by-side monoplane, getting lost in the fog and landing the other side of Fargo Wood to locate position. Harrison gave two tuition flights to Mr. Penfold, during which he searched for the missing Pizey. The latter, however, arrived back before him and then took Lieut. Hall on same machine for tuition. Jullerot busily occupied with the tuition of six officers, Busted in the meantime testing a new monoplane and then taking out a biplane with a pupil as passenger.

There was no flying Thursday owing to a very strong wind.

On Friday morning Pizey made the first flight, but found the conditions too bad for school work. In the evening Capt. Penfold was taken by Pizey for the usual trial and found the conditions still very bad. Harrison made another trip later on but still no improvement, Busted and Pizey out in a Bristol tandem monoplane for a good flight, but no school work attempted.

The wind was far too strong on Saturday for any attempt to be made at school work in the morning. A little improvement in

the evening saw the Bristol staff and pupils out, and a number of passenger flights were made, but no solos were attempted by the pupils. Harrison and Jullerot were out to test the conditions later. Harrison up later, with Messrs. Lywood and Lucena for tuition later. Pizey made a trial flight on a new biplane.

On Sunday the weather was very bad, and all thought of flying was given up.

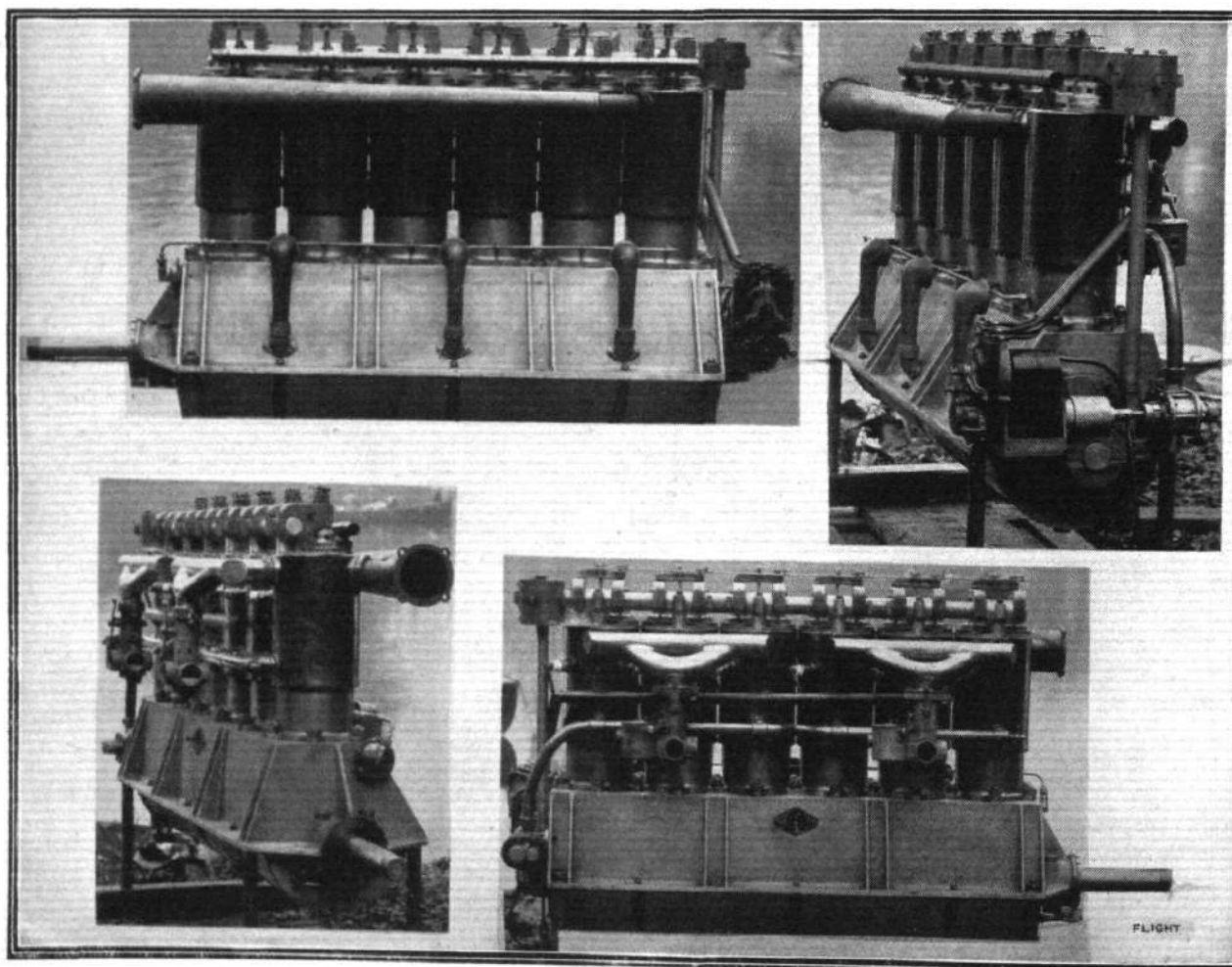
Royal Flying Corps.—Owing to the continued absence of officers and men in connection with the manoeuvres there is practically nothing to record. On Monday, Lieut. Fox and Capt. Dawes arrived from Farnborough on a biplane, and landed by a spiral *vol plané* from a height of 2,000 ft. They had had a delightful journey which had occupied 41 minutes. The Dunne monoplane is again ready for service, and it is not unlikely that Lieut. Fox will make some tests on it shortly. Some eight officers and 60 men went over to Farnborough on Monday for review and to receive their new uniforms. They returned on Tuesday, and will be under canvas at Larkhill until October 15th.



THE NEW 6-CYLINDER 100-H.P. GREEN ENGINE.

It will have been clear to those who have followed recent developments, particularly those who have studied our figures in connection with the Military Aeroplane Trials, that a good British engine capable of developing 100-h.p. ought to find a very wide market. The Green Engine Co., who hitherto have constructed a 60-h.p. motor as their largest model, have realised this opportunity for a long while, and have been working upon designs for a new 6-cylinder engine, which they have just placed on the market. The engine is rated at 100-h.p. and weighs complete with pipes, magneto and carburettors 442 lbs., this being the makers' stated value. The cylinders are not fitted with auxiliary ports unless specially ordered, but the engine is designed on the lines of the previous 4-cylinder model in all other respects except detail dimensions. The valves,

for example, are proportionately larger, so are the chrome vanadium crank-shaft and the cam-shaft. The crank-case, too, has been stiffened by a web throughout its whole length. The water jackets are made of copper sheet that is two gauges heavier than formerly, and no rubber piping is used in connection with the water circulation, which refinement not only makes a neater job but also one that should remove all trouble from leakage. Another minor refinement is that the magneto wires are enclosed and out of sight. The oil pressure has been increased and all the oil to the engine is filtered immediately after it leaves the pump. For the past four weeks the new engine has been undergoing daily tests on the bench, in which trial and the examination that followed it, we understand, the manufacturers find the utmost satisfaction.



"Flight" Copyright.

Photographs of the new 100-h.p. Green engine, which has six separate cylinders, copper water-jackets, and overhead valves; the cylinders are supplied with mixture from two independent carburettors. The exhaust from each cylinder passes through a short branch into a common pipe, which is cone shaped to give a regular increase in area.

BRITISH NOTES OF THE WEEK.

The King at the Manœuvres.

DURING his visit to the manœuvres on Wednesday week, H.M. the King spent quite a long time at the Blue aviation camp, at Hardwicke, near Cambridge. His Majesty was received by Major Sykes, the Commandant, and spent some time inspecting the machines. He personally congratulated Col. Cody on his success in the recent trials and expressed a wish to see the machine in the air. In a few seconds Col. Cody had his biplane up, and while he was circling overhead, Commander Samson returned from a reconnaissance. On landing he was presented to His Majesty. Four other officers were then still out on scouting duty.

Col. Cody Returns to London.

ACCOMPANIED by Col. Capper, Col. S. F. Cody, on Thursday week, returned on his biplane from Hardwicke, near Cambridge, and landed at the Hendon Aerodrome. With a following wind, the trip of about 50 miles had been accomplished in half an hour. The Thursday afternoon crowd gave the visitors an enthusiastic welcome.

Flying Back after Manœuvres.

ON the 20th, Lieut. Spencer Grey on a Deperdussin monoplane, and Lieut. Lestrangle-Malone on the Short tractor biplane, returned from Hardwicke to Eastchurch, making the journey in splendid style. On the following day Lieut. Gordon Bell, with Capt. Webb-Bowen on the Army biplane BE 4 made stops at Hendon and Brooklands during their journey from Thetford to Farnborough.

Mr. Corbett Wilson Again Flies to Ireland.

HIS work in connection with the Army manœuvres finished, Mr. Corbett Wilson decided to fly back to his home in Ireland on

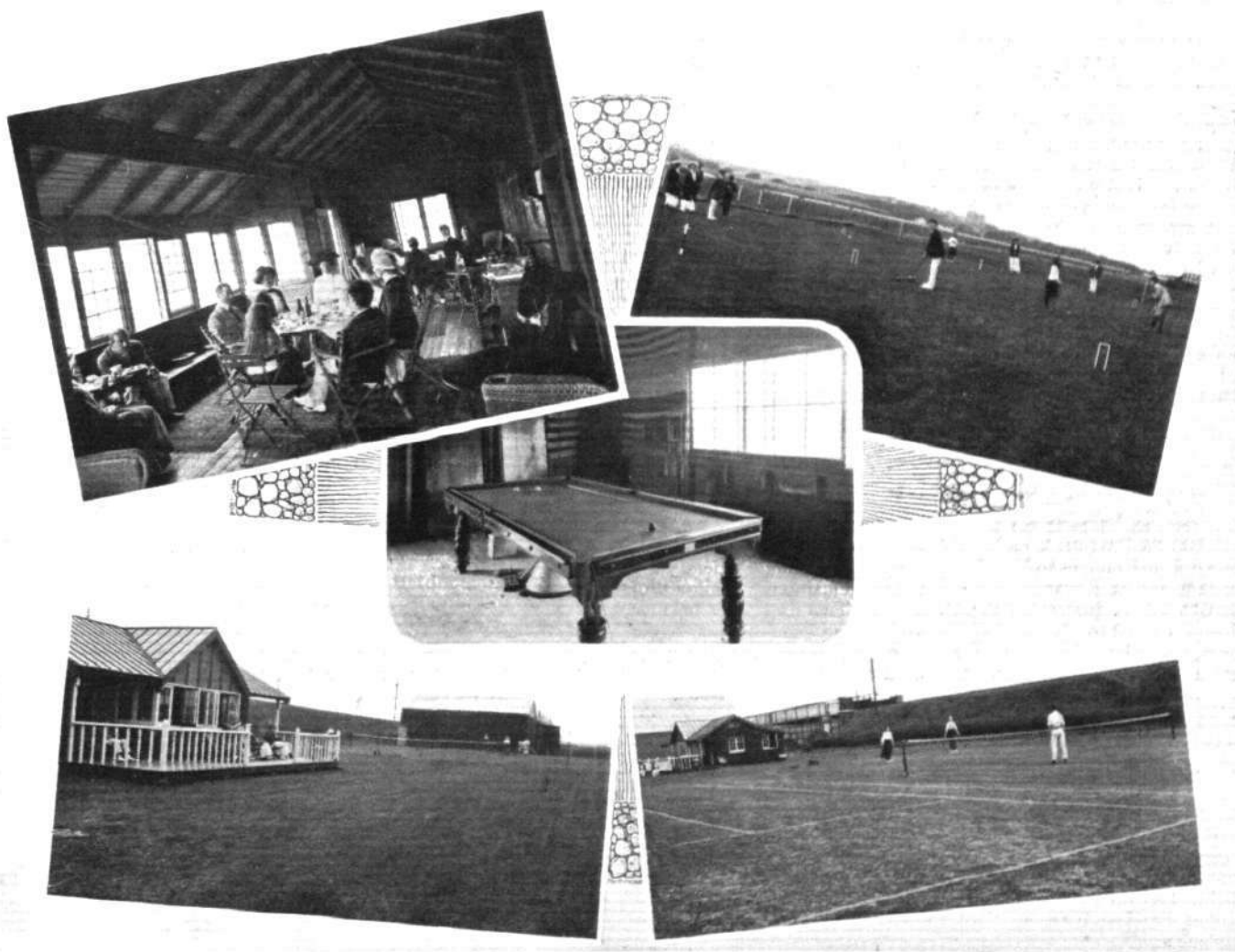
his Blériot monoplane. Starting from Farnborough on Thursday week, he got as far as Chepstow, and on Friday morning he continued to Goodwick, near Fishguard, landing on practically the same spot as on the occasion of his previous trip across the St. George's Channel. The crossing was made on Saturday, when Mr. Wilson was forced to land at Gorey, a few miles N.E. of Enniscorthy, owing to the engine misfiring. The journey of about 55 miles had occupied three-quarters of an hour.

The Diary of a Fall.

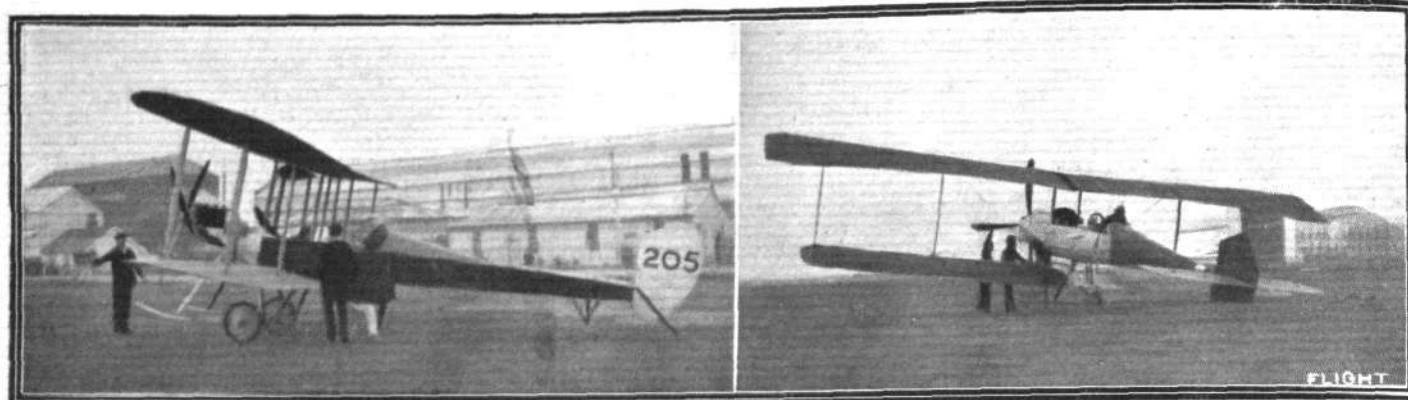
ON the Wednesday previous to his fatal accident at Belfast, Mr. Astley had an exciting experience while flying with Miss Trehawke Davies in France. They started from Liege intending to continue their interrupted journey from Bonn to London, and when near Lille a piece of the floor board gave way and Mr. Astley's heel stuck in the hole. The machine then got out of control and dived to the ground from a height of 200 ft., landing on the right wing. It was, of course, wrecked, but both pilot and passenger had a miraculous escape, and Miss Davies on getting clear of the wreckage proceeded to take some snapshots. During the 200-ft. dive she was able to continue her diary, the brief entry which may surely be claimed as a record of *sang-froid*, being "Planing madly—dive to earth—2.20—bits of us flying now."

Flying at Brooklands.

IN connection with the motor car race meeting at Brooklands to-day, Saturday, the usual aeroplane handicap has been arranged and there is an excellent list of entries. The course is a cross-country one of about 10 miles. Given good weather there will also be a good deal of exhibition flying. The despatch-carrying relay race postponed from a week ago is to be held to-morrow.



BRIGHTON AND SHOREHAM AERO CLUB AND AERODROME.—Some views showing the hangars, club house, tennis courts, croquet lawn, the dining room, &c.



Photos by Mr. M. Pirkis.

A COUPLE OF THE ARMY BIPLANES AT FARNBOROUGH.—On the left Lieut. Mackworth, and on the right Capt. Rayleigh in the pilot's seat prior to an early morning trip over the Common.

Flying at Hendon to-day.

THE attractive programme arranged for the Naval and Military meeting which is to take place at the London Aerodrome, Hendon, to-day, Saturday, foreshadows some excellent flying. According to the programme the opening item at 3 p.m. is to be a review of aeroplanes by the representative of the Secretary of State for War, while actual flying is to open with the Cross-country Bomb-dropping Handicap for a gold cup offered by Mr. H. Knox. The competitors will have to fly twice round a mark about four miles from the aerodrome, dropping the bombs on the completion of the first round. Then will follow the preliminary heats for the open Speed Handicap, after which there is to be a cross-country handicap twice round a triangular course of 12½ miles. This and the other cross-country handicap will only be open to naval, military and territorial officers. Exhibition and passenger flights will follow, as well as a quick dismounting and erecting test and a military aviation display. At 5.45 the final of the speed handicap is to start, after which there will be more exhibition work.

Technical Instruction in Aeronautics.

ENTERPRISE is the keynote of the policy pursued by those responsible for the educational side of the work at Northampton Institute. If any evidence of this were needed it is surely shown by the special courses of lectures and classes in aeronautics which have been arranged for the winter session which is now commencing. Not only so but an elaborate equipment, including a wind tunnel, &c., have been provided so that experimental and laboratory work may be carried on in a way which is not possible at any other institution of the kind in London. The lecturers are Mr. Handley Page and Mr. R. O. Boswall. These unrivalled arrangements should prove of inestimable value to all serious students of aeronautics and it is sincerely to be hoped that they will be adequately supported so that they may be continued and further developed in future years.



FOREIGN AVIATION NEWS.

Etampes to Biarritz on a Blériot.

BARON PASQUIER on his Blériot monoplane on the 17th inst. toured from Etampes to Biarritz by way of Orleans and Poitiers. He made a stop at Royan, and completed the remaining 250 kiloms. of his 650 kilom. journey in the afternoon. Two days later he flew along the coast to Hendaye and after giving an exhibition above the town, started to fly back. He had a fall, however, but with no serious consequences to either pilot or machine.

Another Blériot Special Pilot.

FOR his 200 kilom. triangular test, with two landings, for his superior *brevet*, Lieut. Adam Givonne, on the 17th inst., covered the course Etampes, Vendome, Cercottes Camp and back to Etampes.

Another Successful Rotary Engine.

SPLENDID success has attended the trials which have been carried out at the Hanriot school at Betheny with the new Rossel-Peugeot rotary engine. With a Hanriot monoplane fitted with a 50-h.p. Rossel-Peugeot motor, Bielovucic has made several long flights, including one of two hours on the 19th inst. One of these motors has just been installed in M. Ducrocq's Hanriot school biplane at Brooklands and has given extraordinary results.

More Farmans for Italy.

BY way of concluding the tests of a batch of Farman biplanes built to the order of the Italian Army, Bernard was flying at Buc

The Value of the Helmet.

STRIKING testimony to the value of a safety helmet is forthcoming as the result of an accident which befel Mr. Cyril Foggin, at Eastbourne Aerodrome, on Tuesday. When flying a new machine, with the controls of which he was not quite familiar, Mr. Foggin encountered a sideslip from a height of 60 ft. The machine overturned and pinned the pilot underneath, and he had the uncanny experience of hearing people running up and shouting "he's dead, he's dead." He was able to crawl from under the machine, and although shaken somewhat, was unhurt. There was, however, a dent 2 ins. long in the helmet which it was evident had saved the aviator's life.

The Engine of the Cody Winner.

IN view of its success on the Cody biplane in the Military Trials there are doubtless many people who would like to make a more intimate acquaintance with the Austro-Daimler engine which did so well. An exact duplicate is now on view at the Showrooms of the Austrian-Daimler Motor Co. in Great Portland Street, W., and the firm extend an invitation to all lovers of engineering to inspect it and to have the many special features embodied in its design and construction explained.

Avro School Goes South.

THE Avro School, which has hitherto been located at Brooklands, has secured new quarters at the Shoreham Aerodrome, near Brighton. They are also going still further south as, following an order from the Portuguese Government, it is intended to found an Avro school in Portugal.

An Indian Flying Corps.

IN order to forward the formation of a Flying Corps for India, it is understood that the War Office will allow officers serving in India, or in the Indian Army, to be instructed at the Central Flying School, or to be posted to the Royal Flying Corps.

on the 18th on one of them for an hour and a half. Needless to add all the machines easily passed the tests imposed.

From Villacoublay to Compiègne for Lunch.

ON his altitude-record Borel monoplane Legagneux, on the 19th inst., flew over from Villacoublay to Compiègne, in order to have lunch with his partner, Martinet. The outward journey took three-quarters of an hour, while the return trip occupied ten minutes less.

Flying in Company.

RETURNING to their headquarters after the manoeuvres, Lieuts. Massol, Bellemois and Gaubert on single-seater Blériots, and Sergeants Perretti and Feierstein on tandem Blériots, accompanied by their mechanics, flew in company from Pontleroy to Etampes, on the 20th. In the afternoon Lieuts. Massol, Bellemois and Sylvestre left Etampes in company for Villacoublay.

Mdlle. Marvingt to Try for Superior Brevet.

AFTER a long course of practising at the Deperdussin schools at Betheny, Mdlle. Marvingt has decided to make the tests for a superior certificate at first suitable opportunity.

New Borel Superior Pilots.

LIEUT. ROECKEL on his Borel completed the tests for a superior *brevet* on the 17th by flying from Mailly Camp to Buc. Lieut. Dancourt also on a Borel on the same day flew from the

Chateaufort ground at Buc to Troyes in an hour and a quarter, and later flew back to Buc.

Three-Seater Deperdussin in Service.

AFTER the manoeuvres, Lieut. Schlumberger with two passengers started on the 19th on his 100-h.p. three-seater Deperdussin from Ste. Maure to fly back to Villacoublay by way of Tours. A stop was made for petrol at Etampes and the remaining portion of the journey was accomplished in an hour and a half, the flying time for the whole trip being 3½ hours. The same day, Lieut. Dietrich on a similar machine with two passengers, went from Ste. Maure to Blois, where he was welcomed by M. Bechereau, chief engineer of the Deperdussin works.

Cross-Country Work on Farmans.

ON Monday Lieut. de Larenty Tholozan arrived back at Buc on his M. Farman, which during the manoeuvres had flown over 1,000 kiloms. without the slightest *panne*. After giving exhibitions at Enghien for a week Chevillard, on Monday, flew along the Seine to the Sevres Bridge, where he alighted on the river.

Hydro-Aeroplanes for Japan.

AT Buc, on the 18th inst., Fourny was testing a Maurice Farman hydro-aeroplane ordered by the Japanese Government. The trials were carried out over the Trou Sale, and with supplies for 3 hours the machine rose 300 metres in less than 7 minutes, one attained a speed of 80 k.p.h.

A Condemnation of Aerial Fighting.

AERIAL warfare was considered by the Conference of the Inter-Parliamentary Union at Geneva on the 20th, and a motion introduced by M. Beernaert suggesting the prohibition of such military operations was passed by a large majority although the French delegates offered a most spirited opposition.

For the Coupe Pommery.

UNDETERRED by his previous failures Guillaux on his Clement-Bayard monoplane left Sangatte on the 19th in an attempt to beat Bathiat's flight to Biarritz for the Pommery Cup. He started at 5h. 44m. 59½s. and at 10 o'clock landed at Buc where a stop of 25 mins. was made. Having landed at Montagne in the afternoon he eventually reached Vendome at 6 o'clock and had to give up. With a view to making another start he flew back to Issy on Monday *en route* later for Calais.

The Belgian Hydro-aeroplane Meeting.

THE final official results of the hydro-aeroplane meeting at Tamise show that Chemet (Borel) secured the first place in the general classification with 166.88 points, and he is therefore awarded the cup offered by the Belgian Colonial Minister. Benoist (Sanchez-

Besa) was second with 161.5 points, and Renaux (M. Farman) third with 154.2 points. Beaumont (Donnet-Leveque) was fourth with 138.6 points, and he is awarded the King's Cup.

Double Fatality in Germany.

WHILE flying on an Albatross biplane from Chemnitz to the Doeberitz Military Aerodrome two German Military aviators were overtaken by disaster. When near Freiberg the biplane was noticed to be following an erratic course as though the steering gear was out of order. Suddenly the machine overturned and the pilot, Lieut. Berger, was thrown out and killed instantly by the 300 ft. fall. The other officer, Lieut. Junghaus, remained in the machine and received fatal injuries through the petrol tank falling upon him in the final crash.

Honours for German Military Aviators.

OF the 24 pilots who took part in the recent German Army manoeuvres 9 have been decorated by the Emperor with the Order of the Crown of the Fourth Class. Two officers of the automobile corps were similarly honoured.

Another Inventor Killed.

WISHING to demonstrate his complete confidence in a parachute which he had designed and made, a paperhanger named Bittner threw himself off the top of the Pillar of Victory, in Berlin, on Sunday. The apparatus, however, failed to work and the inventor fell to instant death at the foot of the monument.

An Italian Passenger Height Record.

AT the Mirafiori military aerodrome near Turin, Nosari Guiseppe on an Asteria military machine with 70-h.p. Gnome engine, beat the Italian passenger height record by taking a pupil up to a height of 1,200 metres.

An Italian Pupil Killed.

WHILE making a first flight on a machine invented and built by himself a young Italian—Aldo Inghetti—lost control, and the machine collided with the wall with fatal results to the pilot.

Success of the Kennedy Biplane.

AS a result of the trials of military machines recently carried out in Russia, it is announced from St. Petersburg that the Kennedy biplane has been declared by the judges, to be the best for military purposes from the point of view of taking photographs, dropping bombs, and making observations, &c.

Another American Fatality.

WHILE giving an exhibition flight at Shenandoah, Iowa, on the 20th inst., Russel Blair fell from a height of 300 ft. and was killed.

AIRSHIP AND BALLOON NEWS.

Mishap with the "Gamma."

WHILE making a voyage from Cambridge to Salisbury Plain last week the dirigible, "Gamma," came to grief through collision with a hayrick at Devizes. The airship with five officers on board left Cambridge on Wednesday after dropping "bombs" on to the town, and on Thursday it landed at Calne in Wiltshire. After replenishing with petrol the dirigible went on, and later in the day it made another stop at Chirton Manor where she was anchored for the night. A fresh start was made at 6 a.m. on Friday morning, but some trouble was experienced with the steering gear and another descent was decided upon. When near the ground the car collided with a hayrick and the envelope heeled over. In order to prevent any further damage Major Maitland, who was in charge, caused the envelope to be deflated and the airship was then packed up and returned on a motor-lorry to Farnborough for repairs, which should not take long to effect.

"Beta" also in Trouble.

The "Beta" was delayed at Moulton, near Newmarket, on Thursday week through trouble with the big-end bearings of the engine, and when this was set right it was discovered that the petrol tank was leaking seriously. This was seen to during the afternoon, and on Saturday morning the airship proceeded without further incident to Farnborough.

The New Envelope of the "Gamma."

IN connection with the good work accomplished by the Army airships in the recent manoeuvres it is of value to know that the military dirigible, "Gamma," has just been supplied with a new envelope by Messrs. E. T. Willows, Ltd., the well-known aeronautical engineers.

A Zeppelin in Denmark.

AFTER many delays the Zeppelin dirigible, "Hansa," on the 19th inst., succeeded in making the journey from Hamburg to

Copenhagen, the 190 miles being traversed in 6½ hours. Hamburg was left soon after 4 a.m. and the Danish capital reached shortly before eleven. After a stay of about half an hour for lunch the dirigible, which had eleven passengers on board, left on the homeward journey *via* Malmoe in Sweden, and arrived back at Hamburg at 4 p.m. Count Zeppelin was in charge. Two days previously Count Zeppelin sailed the airship, with sixteen passengers on board, to Heligoland and back.

12-hour Voyage by "Conte."

THE Astra dirigible, "Conte," left Issy at 6 p.m. on the 16th inst., and after cruising all night, landed at 6 a.m. the next morning, in order to effect an adjustment of the propeller. When this work had been completed the airship returned to Issy, having been in service for five months, the envelope will now be deflated, and the airship given a thorough overhaul.

Long Trials with "Adjutant Vincenot."

WITH eleven passengers on board, the military dirigible "Adjutant Vincenot" was cruising over Paris for an hour on Tuesday morning. On the 17th inst. it made a cruise of 2½ hours from its station at Issy.

The Grand Prix Balloon Race.

THE balloon race for the Grand Prix of the Aero Club of France on the 22nd inst. was practically decided by the sea. Eighteen balloons started from St. Cloud and all sailed away in an easterly direction. Those which were carried over Normandy had but a brief run, and those which were able to maintain a more southerly course and so keep over Brittany had the advantage. M. Leon Bartheou brought his balloon down at Porspoder on the coast while M. Demuyter, of Belgium, landed close by at Landunvez, so the Aero Club of France have to decide which covered the greater distance. M. Blanchet, who landed at Telgruc, will probably be awarded third place.

AN ATTEMPT TO INVESTIGATE THE PHYSICAL PROPERTIES OF A TWISTED SKEIN OF RUBBER.

By W. W. HASTINGS RIDER and ALLAN P. HITCHENS, B.Eng. (Liverpool).

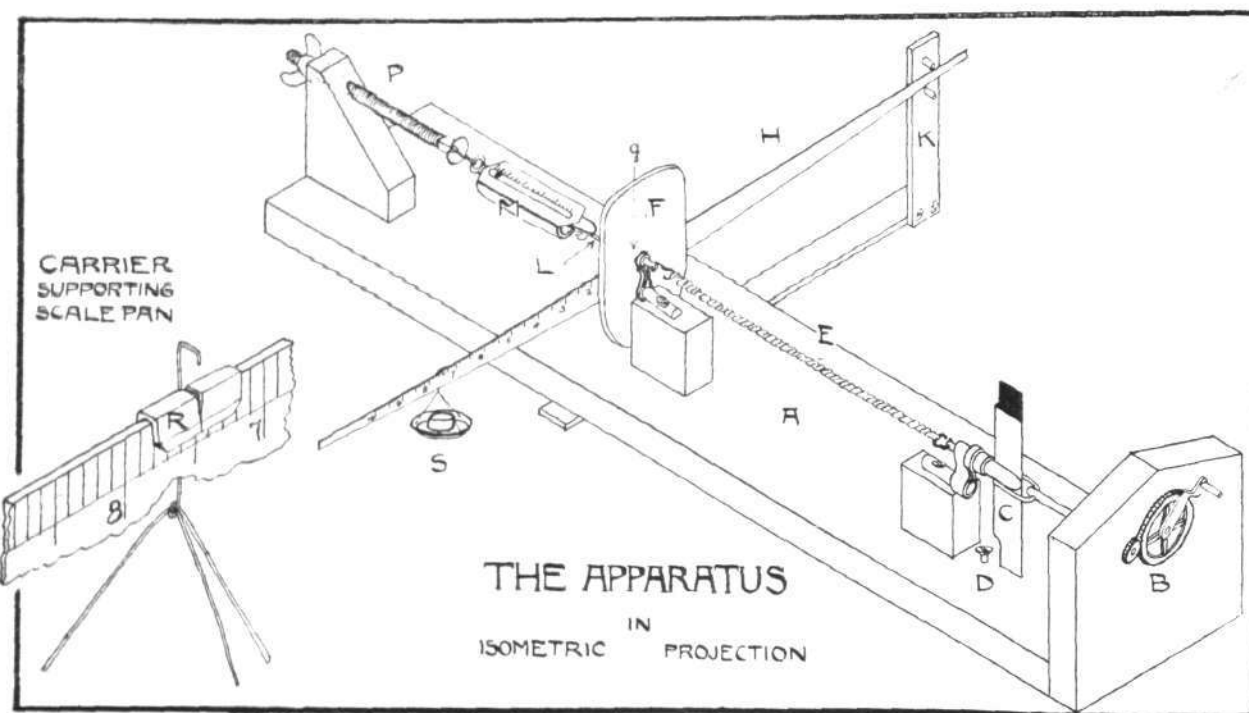
As the twisted skein of rubber is the recognised power unit of model aeroplanes, five series of experiments were conducted to ascertain the following points:—

1. The total energy that can be stored in one pound of rubber under given conditions.
 2. The maximum number of revolutions that can be given to a certain skein of rubber.
 3. The maximum and mean torque thereof.
 4. The effect of various lubricants.
 5. The effect of an initial stretch in the skein.
 6. The drop in torque and energy due to continued use.
- The apparatus used was entirely of our own design and manufacture.

mean values of both torque and end-pull over any given range of revolutions from zero to fracture can be determined. See Table b.

The following is a brief description of the principal parts of the apparatus, the letters having reference to the accompanying lettered sketches:—

- A, bed of apparatus, composed of a piece of pine 29 ins. by 6 ins. by 1 in.
- B, geared winder (5 to 1).
- C, strip of wood, which, by engaging with the pin, D, prevents the rubber unwinding while a reading is being taken.
- E, skein of rubber, generally 10 ins. long, stretched to 10½ ins. (5 per cent. stretch).



Its governing principle is, that the torque of the rubber, transmitted through a hook and shaft, is counteracted by that of a known sliding weight placed at a certain distance along the arm of a balanced lever, the end pull of the rubber being neutralised by that of a spring balance placed on the side of the lever opposite to the rubber.

The chief advantages of our apparatus are:—

1. No loss of energy in friction, *c.g.*, where the rubber is made to lift a weight by means of gearing and pulleys.
2. The actual energy stored right up to the point of fracture can be measured.
3. Such measurement accurate to within 2 per cent.
4. Large range of action possible.
5. By one experiment on one skein of rubber the maximum and

F, shield of three-ply fretwood, to prevent the lever and bearings being damaged when a specimen of rubber fractures.

G, collar and ball-bearing enclosing the shaft through which the torque of the rubber is transmitted to the lever.

H, balanced and graduated lever 24 ins. long and 1/8 in. thick, carrying on one arm an aluminium carrier, R, and scale-pan, S, which together weigh 15 oz.

K, L-shaped arm carrying the stops which limit the rotation of the lever.

L, double loop of linen thread acting as a link between the lever and the spring balance to obviate the damping effect which the latter might have on the rotation of the lever.

M, spring-balance reading in ounces up to 5 lbs.

TABLE b.—Analysis of Experiment B7.

Range.	c_1	Revs. $R' = \frac{c_1 l}{\sqrt{n}}$ $= \frac{c_1}{.565}$	Max. Torque. T in.-ozs.	T Ratios. Per cent.	Area each separate Strip. Sq. ins.	Total Area. A sq. ins.	Mean Torque $= 200 \frac{A}{n}$ $= t$ in.- ozs.	$\frac{t}{T}$	$\frac{t}{T_F}$	Energy each separate Strip. Ft.-lbs.	Ratios. Per cent.	Total Energy. Ft.-lbs.	Ratios. Per cent.	Total Energy per lb. Ft.-lbs.
Single ...	6.2	11	8.0	13	.22	.22	4.0	.5	.066	1.42	1.1	1.42	1	38
Double ...	21.3	38	11.5	19	1.23	1.45	7.6	.66	.125	8.01	6.2	9.47	7	253
	50.0	89	16.5	25	3.55	5.00	11.2	.68	.184	23.13		32.60	23	870
Treble {	60.0	107	19.8	32	1.62	6.62	12.4	.627	.203	10.60		43.20	31	1,150
	70.0	125	24.7	40	2.01	8.63	13.8	.56	.226	13.30	100	56.50	41	1,500
	80.0	142	31.2	51	2.44	11.07	15.6	.50*	.256*	16.90		72.40	52	1,930
	90.0	160	40.6	67	3.34	14.41	18.0	.44	.295	22.60		94.00	68	2,500
Fracture ...	105.0	187	61.0	100	6.79	21.20	22.7	.37	.37	44.00		138.00	100	3,680

In columns 6 and 11, Strip refers to the portion of the torque-revs. graph included between two ordinates at successive values of R' .

GENERAL TABLE A.—Section and Lubricant Varied. Full Tests.

No. of Experiment.	Section.	Length, Inches.	Stretch, Per cent.	Weight, Ozs.	State.	Revs. R.	End Pull, Ozs.	Torque at Fracture, T_F inch-ozs.	Mean Torque, T inch-ozs.	T_F	Energy, E ft.-lbs.	E Lubricated	E Dry	Energy per lb. Ft.-lbs.	Remarks.
1	4 of $\frac{1}{16}$ in. sq.	9.5	10	.0775	Dry ...	309	18	2.16	.872	.404	8.815	—	—	1,920	
2	4 " $\frac{1}{16} \times \frac{1}{16}$ in.	9.5	10	.0863	" ...	344	19	2.40	1.100	.458	12.76	—	—	2,360	
3	1 " $\frac{1}{16}$ in. sq.	9.5	10	.0735	" ...	389	—	1.55	.686	.443	8.74	—	—	1,900	Clean fracture.
4	16 " $\frac{1}{16}$ "	10.0	5	.298	" ...	150	73	18.00	7.320	.407	36.00	—	—	1,930	
5	4 " $\frac{1}{16}$ "	10.0	5	.352	" ...	158	75	16.40	7.320	.447	37.80	—	—	1,730	
6	1 " $\frac{1}{16}$ "	10.0	5	.318	" ...	148	50	11.70	5.400	.462	26.00	—	—	1,310	Clean fracture.
Lubricated.															
7	4 " $\frac{1}{16}$ "	9.5	10	.0775	Pure soft soap ...	568	24	2.94	1.110	.377	20.6	2.34	—	4,500	
8	4 " $\frac{1}{16} \times \frac{1}{16}$ in.	9.5	10	.0863	" ...	554	28	3.46	1.375	.398	24.9	1.88	—	4,430	
9	1 " $\frac{1}{16}$ in. sq.	9.5	10	.0735	" ...	577	21	2.66	.933	.35	17.6	2.02	—	3,830	Fractured at string fastening end loop
10	8 " $\frac{1}{16}$ "	10.0	5	.150	Commercial liquid ...	373	37	6.00	2.414	.402	29.4	—	—	3,140	
11	2 " $\frac{1}{16}$ "	10.0	5	.176	" ...	375	37	5.70	2.440	.427	29.9	—	—	2,900	
12	16 " $\frac{1}{16}$ "	10.0	5	.298	" ...	268	81	18.40	7.400	.403	64.8	1.70	—	3,480	
13	16 " $\frac{1}{16}$ "	10.0	5	.298	French chalk and soft soap	296	74	19.30	7.510	.376	72.1	2.01	—	3,880	
14	4 " $\frac{1}{16}$ "	10.0	5	.352	Commercial liquid ...	296	83	23.00	8.76	.38	84.7	2.24	—	3,850	
15	1 " $\frac{1}{16}$ "	10.0	5	.318	French chalk and soft soap	267	52	12.90	6.15	.477	53.7	2.06	—	2,700	Fractured at string fastening end loop
16	24 " $\frac{1}{16}$ "	10.0	5	.446	Commercial liquid ...	187	—	34.8	14.73	.420	90.0	—	—	3,230	
17	24 " $\frac{1}{16}$ "	10.0	5	.446	French chalk and soft soap	203	—	30.8	12.03	.390	80.0	—	—	2,870	
18	7 " $\frac{1}{16}$ "	10.0	5	.540	Mixture C.L. and S.S.	203	—	39.0	15.67	.402	104.4	—	—	3,090	Fractured at both loops before section failed.
B 7	32 " $\frac{1}{16}$ "	10.0	5	.600	Commercial liquid ...	187	—	61.0	22.7	.372	138.0	—	—	3,680	

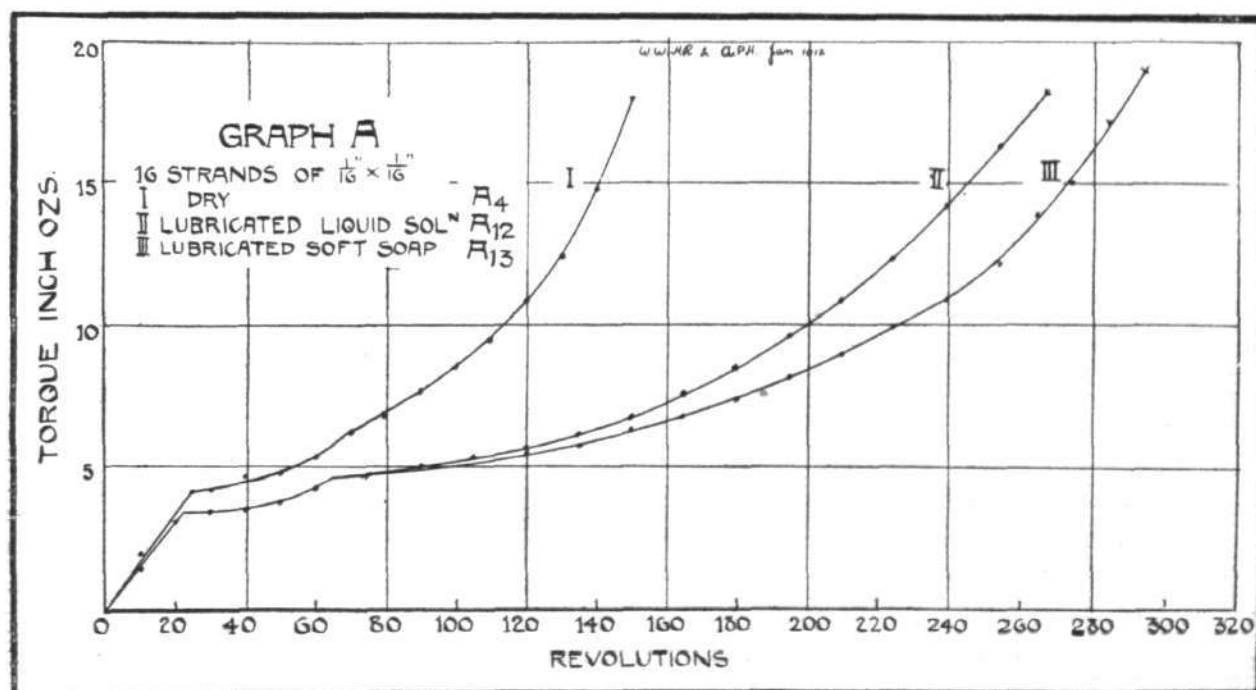
P, $\frac{3}{8}$ -in. Whitworth bolt and wing-nut controlling the spring-balance.

The readings were taken in the following manner:—After winding the cable of rubber to the required degree, the winder was locked by the pointer, C. Next the wing-nut was screwed down until the tension introduced through the spring-balance, overcoming the pull of the rubber on the lever and shaft, caused the balls and race to lose contact. Then the wing-nut was gradually unwound until contact was just restored, the reading on the spring-balance giving the end-pull of the rubber. A suitable weight was then placed in the scale-pan, and the sliding-carrier moved along the lever till perfect balance was obtained, the bed of the apparatus being sharply tapped the while. It will be noticed that owing to the tension of the spring-balance, there is, at the moment of reading the torque, no end pressure whatever on the bearing, to which fact the sensitiveness of the instrument is due—the error in the value of the torque being less than 1 per cent. (moving the carrier $\frac{1}{16}$ in. at 7 in. radius changes the direction of rotation of the lever).

The following remarks apply generally to all the experiments:—

The tests were of two kinds—full tests and partial tests. In the former, readings of torque and end pull were taken every few revolutions as the specimen was gradually wound up to the point of fracture, the final reading of the torque being obtained by producing the graph in each case. In the partial tests only a few readings were taken in order to obtain the values at fracture. It was noticed that if the twisted skein were left for a few seconds, an appreciable drop in torque resulted, especially in the later stages of the experiment. For this reason care was taken that each test should be conducted at a uniform rate.

Reference to the general table will show that not only is rubber extremely variable in quality, but also is greatly influenced by exterior conditions, such as age, lubrication, &c., and so every care was taken that each series of experiments should be carried out under the same conditions. It was for this reason that one strand, whatever be its form or section, was adopted as the unit in the formulæ given below instead of the actual area of cross section.



In twisting rubber, most people will have noticed the peculiar knotting that takes place. It was found that this knotting was regular, and took the same form whether the skein was dry or lubricated, loosely applied, or stretched 100 per cent. The cable takes three distinct forms—first, when winding has begun, the diameter gets smaller and smaller until a knot is formed; others follow in regular sequence, and as winding proceeds, travel the whole length of the cable, which is then quite uniform in appearance. After that another change takes place. Further tightening results in the formation of another but very irregular series of knots, and this continues until fracture occurs. To distinguish between these stages, we have called them single, double, and treble, and the two points where the changes occur, doubling and trebling points respectively.

Our previous practical experience having proved beyond all doubt the efficacy of lubrication, in all the tests with the exception of six (Table A) the rubber cable was well lubricated.

We will now proceed to discuss the experiments in detail, the following being the principal symbols employed.

R = number of revolutions.

l = length of the cable in inches.

n = number of strands in the cable.

$T_F = T_c$ = torque at fracture.

\bar{t} = mean torque over the whole range.

T_{c1} = torque when $R = \frac{c_1 l}{\sqrt{n}}$.

\bar{t}_{c1} = mean torque over range $R = 0$ to $R = \frac{c_1 l}{\sqrt{n}}$.

Note.—The torque is measured in in.-ozs.

Series A.—To find the total energy that can be stored in 1 lb. of rubber under given conditions.

Obviously the energy that can be stored under similar conditions

in a skein of rubber varies as the weight of that skein. And so the question naturally arises how much energy can be stored in one pound of rubber? A glance at the general table, in which only the section and lubricant varied, will indicate the difficulty of answering this important and oft-repeated question of aero model makers. In order to obtain as much information as possible on this point 19 full tests were carried out, the results of which are tabulated in Table A. A graph of torque against revolutions was obtained in each case, three of which are shown in graph A, in which are given the graphs of a cable composed of 16 strands of $\frac{1}{8}$ in. square rubber cord, dry, and lubricated with two different lubricants. We may here mention that the most striking result of the tests—at least to our mind—was the remarkable similarity of the curves of T and R for all kinds of rubber under all conditions, and it is this fact that justifies us in making the assertions with which we conclude the next series of experiments.

Now the energy stored in any skein is given by

$$\frac{2\pi R l}{l} \text{ in.-ozs.} \\ = .0327 R l \text{ ft.-lbs.} \quad (1)$$

the values of which are given in Table A.

The weight (w in ozs.) of the rubber in its dry condition having been previously obtained, we may write:—

Energy stored per lb. of rubber

$$= .0327 R l \times \frac{16}{w} \text{ ft.-lbs.}$$

$$= .523 \frac{R l}{w} \text{ ft.-lbs.,}$$

the values of which are given in the last column of Table A, the average for unlubricated skeins being 1,900 ft.-lbs., and for lubricated 3,500 ft.-lbs.

(To be concluded.)

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Hand-launched	Distance	A. E. Woollard	477 yards.
	Duration	A. F. Houlberg	89 secs.
Off ground	Distance	F. W. Jannaway	84 yards.
	Duration	G. Rowlands	30 secs.
Hydro, off water—Duration		G. P. Bragg-Smith	25 secs.

*Membership and Annual Subscriptions.—Members who have not sent their subscriptions for 1912 are asked to send them in at once to the hon. secretary, and so help to facilitate the work of the Association. The council hope that all members will endeavour to extend the membership, and will introduce at least one new member before Xmas.

War Kite Squadron.—It has been decided to hold a kite display in London, on Saturday, October 5th (weather permitting). Any member or friends wishing to help should advise the hon. secretary at once. Members of the kite section are asked to make arrangements to attend to assist Major B. Baden-Powell with his man-lifting team of kites. If possible, Col. S. F. Cody will be present, and also a kite section of the Army will attend and give a display if the War Office will give permission. The place and time will be notified in next issue as well as in the Press.

*Official Trials.—The council will be pleased to receive applications from clubs in the London district for the next official trials to be held on their ground. The council also are pleased to see that the clubs on whose ground the trials have been held have managed to beat the existing records. They should be held in south-western or northern district in November and December.

27, Victory Road, Wimbledon.

W. H. AKEHURST, Hon. Sec.

MODEL CLUBS.

Aero Models Association (CANTON HOUSE, WESTMINSTER).

ON 14th. best duration, M. B. Ross, 56 secs.; H. E. Fletcher, 52 secs. Others flying: H. Tosh, B. Brown, H. J. Hindley (tractors) models. E. R. Jones, good altitudes with small tail-behinder. To-day (Saturday), monthly competition (duration). October 2nd, committee meeting. Enfield Challenge Contest postponed until October 26th. Entry forms shortly.

Birmingham Aero Club (8, FREDERICK ROAD, EDGBASTON).

A FINE glide was made Saturday with Mr. Warren as passenger, the height he rose to being 25 ft., the full length of the ropes. Unfortunately, whilst being towed, with Mr. Noble as passenger, the glider turned out of the wind, tipped over, and then turned a complete somersault. Mr. Noble, however, dropped out whilst the glider began turning, and escaped with a sprained arm. The only damage to the glider was a broken upper plane, which was not very serious. It is hoped to have all repairs effected during the week. Some good model flights have been made by Messrs. G. Wilde, G. Baker and H. F. McManus.

Blackheath Aero Club (48, HAFTON ROAD, CATFORD, S.E.).

SATURDAY, at Grove Park, Messrs. Attwood, Morgan, Eland and Woollard flying. Sunday, 14 models, Blackheath, 7 r.o.g. single tractor machines and 7 twin-propeller models. Monday, at Grove Park, Mr. Woollard flying single-stick and A-frame models. Flying Saturday at Kidbrook, Sunday at Blackheath and Grove Park.

Brighton and District ("KINGSLEIGH," KINGSWAY, HOVE).

SATURDAY, at Shoreham; wind terrific; three machines smashed. Flying by Mr. A. F. Houlberg (excellent flights). Williams (new r.o.g. biplane). Akers, 38 secs.; Barca, 33; Kerruish, Knowles, Wiedmann, White and others.

Bristol and West of England (CLIFTON DOWN HOTEL, CLIFTON).

MEETINGS 14th and 21st well attended. Long flights by Lee's 4-ft. monoplane and many other machines. Competition for flight across the Gully will be continued to-day (Saturday), at 3.30 p.m.

CLUBS.

Chislehurst and Dist. Ae.C. (JASMINE COTTAGE, CHISLEHURST).

FLYING Sunday afternoon on cricket ground.

Croydon and District Aero Club (Sec., 136A, HIGH STREET).

SATURDAY, at Mitcham Common, Messrs. Bell (398 yards) Pavely, Hart, Peplow, and Weston flying models. Wind very boisterous. More members wanted as workshop enlarged.

Hackney and District (THE HOLLIES, 47, JENNER ROAD, N.).

DURATIONS, Saturday: S. Dore, 62 secs. (1-1-0 P2); W. Dore, 60 (1-1-0 P2), 10 oz.; Vans, 57 (0-1-1 P2); Louch, 40 (1-2-0 P1); Mond, 40 (out of sight) (0-1-1 P2); Herron, 23 (r.o.g.) (1-1-0 P2). Longstaffe experimenting with 0-1-1 P1, Barton with miniature tractor. Illuminated flying in evening. General meeting Oct. 4th at Spensley Hall, Brooke Road, when club is to be re-formed.

Hendon Model Aero Club (8, MONTAGU ROAD, W. HENDON).

RESULTS of Saturdays meeting: Monthly duration trophy, Lawrence, all-round prize (stability, altitude, duration, planing down, &c.), Barton. Lawrence and Short both raised club record to 40 secs. Hedge's baby (1-1-P2) reached splendid altitudes. Brown, Mitchell, Doidge, Hills, and Hayward also flew. Flying to-day at 3 p.m.

Leeds and District Aero Club (5A, HULLAND ST., HUNSLET RD.).

Two local gentlemen have come forward and placed at the disposal of the Club a 28-h.p. monoplane and a partly finished tractor, Avro type, biplane, which will be completed, and an engine installed by members of the Club. Hangars are being erected on the Club ground, and it is hoped to have a good opening meeting some time next month.

Leytonstone and Districts Aero Club (64, LEYSPRING ROAD).

WIND spoilt flying on Sunday on Wanstead Flats, but flights were made by F. Hawthorn, G. Hawthorn, and F. Grattan. Will members try and meet earlier, about 8 a.m. Meeting at 64, Leyspring Road, 8 p.m., Oct. 1st.

Reigate, Redhill and District (8, BRIGHTON ROAD).

COMPETITION for Col. Rawson's Cup held in fierce gusty wind, on 21st. Won by J. L. Sutton with 1,177 marks; R. Wilson and A. Lewis second and third, with 950 and 922 respectively. J. W. Burghope's model flew clean away, last seen going over houses 600 yards from start. Sutton did 577 yards and 50 secs. Other competitors: M. Wilson, H. Greenhead, W. H. Worton, and H. Jordan. Numerous spectators, including Messrs. Mann and Grimmer. Sunday, at "Wiggie," same members and H. Moon, of East Grinstead Club, flying in fresh gale.

Scottish Ae.S. ("ROCHELLE," LIMESIDE AVENUE, RUTHERGLEN).

FIRST monthly competition last Saturday at Paisley Racecourse. Results: Distance: Mr. W. C. Boyd, 1,056 ft.; Mr. J. C. Balden, 963 ft.; Mr. W. G. Langlands, 486 ft. Duration: Mr. W. C. Boyd, 51½ secs.; Mr. J. C. Balden, 39½ secs.; Mr. J. S. Gordon, 35½ secs.; Mr. W. G. Langlands, 35 secs.; Mr. C. F. Arthur 32½ secs.; Mr. Ian S. Ross, 30 secs. To-day (Saturday) and Monday, Sept. 30th, flying meetings at Lanark Aerodrome. Next Saturday hydro-aeroplane meeting at the pond, Maxwell Park, Pollokshields. Members please note that during October the workshop will be open on Tuesday, Thursday and Saturday evenings.

South Norwood (37, CLIFFORD ROAD).

SATURDAY, at Davidson Road: Daniels (A frame), 45 secs., 230 yards; Stemp (tractor), off ground in 2 yards; Webb (single stick), 43 secs., 250 yards.

Worcester Model Aero Club (CORN MARKET, WORCESTER).

SATURDAY successful meet to open new Gorse Hill flying ground, kindly lent to club by Mr. Harvey Smith. Twenty members present with models. Distance competition won by H. S. Melhuish, 380 yds. (Trykle type); 2nd, Mr. Colton, 191 yds. Duration: Messrs. Davis and Whittaker tied with 14 secs. Others flying: Mr. Colton and the secretary (Houlberg type), Mr. Pollard (Trykle type), Mr. Woodman (automatic stability biplane), Messrs. Harrison, Willmott, Davis and Whittaker. A point-to-point competition next week-end for secretary's prize.

Yorkshire Ae.C. (Model Sec.) (53, WEST STREET, LEEDS).

COMPETITION to-day at Woodhouse Moor, 3 p.m.

Models

Conducted by V. E. JOHNSON, M.A.

The Second Hydro-Aeroplane Competition.

THIS, as already stated in FLIGHT, was held at the Welsh Harp, on August 31st, and attracted no less than thirty-three entrants—with three trials each, this means a possible ninety-nine flights. Quite a number found themselves at the last minute unable to compete, chiefly owing to non-tuned-up machines, and in the end twenty actual flights (of over 10 secs.) were made. Before and during the earlier portion of the contest a nasty and very tricky cross wind was blowing, and in the trial flights and the first round of the contest "turning turtle" in attempting to rise was very much in evidence. The manner in which it occurred was very interesting (to watch) and is not without interest in regard to full size machines. Suppose the machine hydroplaning due north, and the wind north-east to nearly east, the action of such a wind is that it tends to elevate the right-hand side of the machine, the right float therefore becomes more buoyant and rises first—the left acting to some extent as a drag, the machine swings round on this as on a pivot, tilts still further and exposes its surfaces more or less broadside on to the wind and straightway heels over to the left. It should be carefully noted that a broader lateral flotation base does not *per se* overcome this difficulty, as a matter of fact, it is but lengthening the arm of the lever, and in a case of this kind the narrower the base the better. The great difficulty that the competitors (in this and the previous contest of the same kind, had to deal with was undoubtedly the finding of a sheet of water large enough to experiment on, one of the conditions being that "the

The very small amount of rubber employed, less than is often used in the ordinary r.o.g. type, should be carefully noted.

Mr. Williams was one of the first to experiment in this country with model hydro-aeroplanes first rising from the water some eight months ago. In the former competition he was so unfortunate as to collide with a boat and smash up his model so that his success is in every sense of the word a well-merited one.

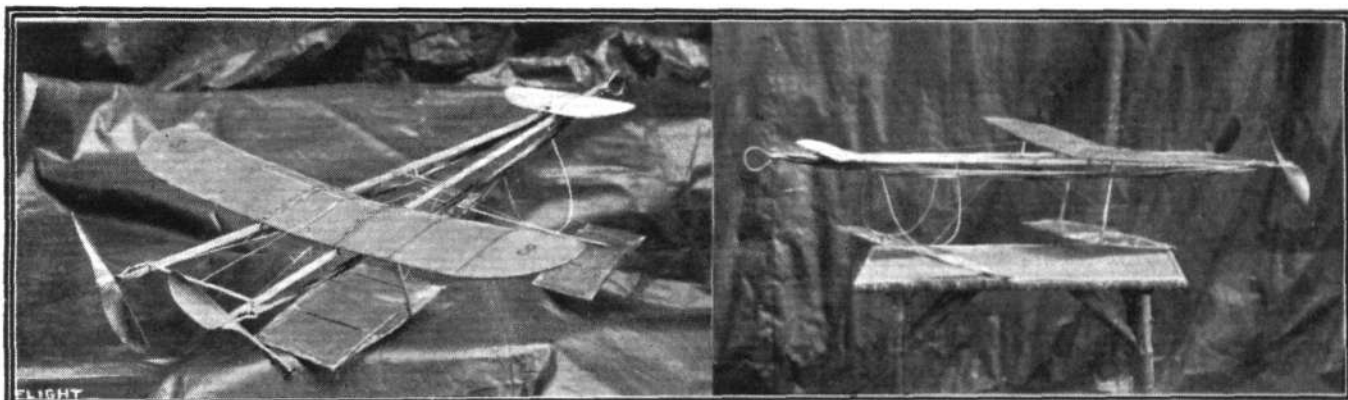
The reader should not fail to note that his model is a true hydro-aeroplane, such as we have always advocated, as opposed to an aeroplane on punt-like floats. The section of his floats also very closely corresponds with a section already given in FLIGHT, but in Mr. Williams' case the nose or prow is sharper, *i.e.*, brought more to a point. The steep angle at which the forward front floats are set—obviously to counteract the high thrust of the propeller—should be noted.

The line of propeller thrust obviously fails to fulfil one of the chief elementary laws of aerodynamics, and one would expect such a model to pancake more or less on landing, and unless our memory plays us false, such was the case.

Mr. Williams has omitted to state one very important item, the position of the centre of gravity.

Replies in Brief.

DOUGLAS STEWART.—It would no doubt be possible to form such a club as you suggest, provided the right people took it in hand and ran it on straightforward business-like lines. The



Mr. W. J. Williams's model, "Dragon Fly," which secured first prize at the recent competition at the Welsh Harp.

model must rise from and alight on the surface of the water." In later competitions no doubt this will be altered to requiring the model to rise from the water and alight on land (*i.e.*, without damage), and where practical to also accomplish the opposite task. There are plenty of ponds about London sufficiently large for the model to rise from, and competitors would thus be enabled to turn up with a properly tuned-up machine. Some of the competitors we know did the above, chancing damaging their floats, but generally speaking the models were designed only to land on water.

We give two photographs and the chief particulars of the winning machine, together with some remarks thereon.

Mr. W. J. Williams' Model Hydro-Aeroplane.

Main plane.—Span 30 ins., chord 5 ins., weight $1\frac{1}{8}$ ozs. Bamboo framework covered with Bragg-Smith proofed silk.

Elevator.—Span 9 ins., chord $2\frac{3}{4}$ ins.

Vee or A frame.—Length 2 ft. 9 ins.

Propellers.—Twin, 8 ins. diameter, 16 ins. pitch.

Floats.—Usual covered framework type. The dimensions of the two front ones are: Length $5\frac{1}{2}$ ins., width $3\frac{3}{4}$ ins., depth $\frac{1}{2}$ in. Weight $\frac{1}{2}$ oz. each. The back one is of exactly the same type, and the following dimensions: Length $8\frac{1}{2}$ ins., width $5\frac{3}{4}$ ins., depth $\frac{7}{8}$ in. The photographs clearly show the positions of the respective floats, and also the wide base given to the front floats for the purpose of "landing." The total weight of the model is $7\frac{1}{2}$ ozs., and the weight of the rubber (8 strands $\frac{3}{16}$ in. flat) $1\frac{1}{2}$ ozs. The ratio of the weight of rubber to total weight of machine, therefore, being as 1 to 5. Mr. Williams' best duration in the competition was 31.2 secs.

number of model clubs that have been started or mentioned in FLIGHT this year is, we believe, well over 60—the number that have succeeded or even tried to develop themselves into practical aero clubs (badly wanted) appears to be practically nil. Gliding forms an excellent introduction to such, but there appears to be very little of it going on or, at any rate, heard about it.

C. N. HAY.—We have not the slightest idea what you mean by a tremendous height, but judging by a former photo you sent we should judge it to be about the height at which good models of that type usually fly. It is good, but quite common in competent club flying. You should be able to fly successfully, with less rubber than that quoted in the formula referred to.

D. M. W. COWAN.—If you write again, giving any further information you can think of and any ideas of your own on the subject, and enclose a stamped and directed envelope, we will reply by post. Your query is not one that can be dealt with in these columns.

H. L. ADDIS.—The statement in FLIGHT is perfectly correct, the distance and duration records you mention are not official.

A. J. DABBS.—Both types of the CO₂ motors mentioned by you can be obtained at Messrs. Gamage and Co., Holborn. Since writing the article referred to we have had further experience with the CO₂ type of motor, and it possesses certain drawbacks (especially if of the rotary type), to which we purpose referring later on. Enquire carefully into costs and possibility of re-charging, actual static thrust given, which must be at least quarter total weight of entire model, &c. It is absolutely useless without a hot-water cylinder, or its equivalent, and so far we have not seen its equivalent in practice.

CORRESPONDENCE.

Pressure Distribution on Planes.

[1631] I have read with great interest your notes on Mr. Handley Page's lecture to members of the Aeronautical Society on March 27th. I shall be much obliged if you will kindly inform me whether M. Eiffel's work has appeared in English translation and, if so, who are the publishers.

I must admit that I have been startled by the statement at the foot of page 402—that "the shaded area above the section is negative pressure (suction)." Is that statement made on the authority of M. Eiffel. If so, it would be interesting to know what steps he took to differentiate between pressures having positive and negative origin. If the diagrams, as explained by the statement which I have quoted, correctly represent the facts, it follows that by far the greater part of the lift in an aeroplane is due to vortex action on the back of the wing. This conclusion appears to be so much opposed to all that reason and observation suggest, that I venture to hope that you will be so good as to supplement your notes of this week by indicating the methods employed by M. Eiffel to determine the nature of the pressures. I venture, further, to add that, if you do this, you will place your readers under a debt of gratitude unequalled by anything since the publication of the Hankin papers.

I had convinced myself that the vortex as an efficient principle in flight could not stand, and I am sure that there are many others in the same state of mind to whom your notes must have come as a great surprise.

Castlereagh, Co. Roscommon.

MAURICE J. DODD.

[As desired, we deal with this subject on page 873.—ED.]

Gyroscopic Force and Accidents.

[1632] Less than two hours before the accident that killed Paul Peck I had a talk with him on the subject of the danger in gyroscopic force. He admitted that at times this force had caused him considerable trouble, but said that he did not believe it to be particularly dangerous. I explained to him several conditions that would excite gyroscopic force in his motor to a point where it would become highly dangerous and told him that should he ever meet one of these conditions he would at once become convinced that I had not over-estimated the peril, but that he would then be in the same fix as the other fellows that have gone before, *not able to tell about it*. The newspaper accounts of the accident say "No one but Paul Peck could tell exactly what caused the accident."

I had just examined Peck's new machine and told him that he would have to be extremely cautious in the use of its controls as it, in my opinion, would be highly susceptible to the elevator and would rock lightly about its lateral axis. You will notice by the newspaper accounts that after his first flight he spoke particularly about this very feature, and it was no doubt one of these sudden dips that excited gyroscopic force and caused the spiral movement in his machine. I found three eye witnesses, not one of whom was an aviator, who distinctly saw Peck turn his controls contrary to his path of flight, but in all the accounts of the accident given out by the aviators not one of them mentioned the fact that the machine spiralled with its rudder turned to the outside of the circle and pitched downward with its elevator raised to the limit! Nor did anyone think it worth while to mention that during all this time the motor was spinning at top speed, yet these three features of the accident were completely ignored in all published accounts.

Peck said that, while he did not believe there could be any great danger from gyroscopic force, he was open to conviction and asked me to bring out to him the following afternoon a copy of my new article on the subject. I was there with the copy at the appointed time, but too late.

Chicago.

THOMAS PRESTON BROOKE.

Engine Cows.

[1633] The similarity in the lamentable disasters by which the lives of four brave officers of the Royal Flying Corps have recently been lost in the service of their country leads one to consider the question of any dominant features common to the machines flown, that might be contributory to these fatal results.

Both machines were fitted with so-called "rotary" engines—more correctly speaking, engines with revolving cylinders having reciprocating pistons—and each machine was supplied with an open-mouthed hood or cowl to the engine. Anything more opposed to one's preconceived idea of a "stream-line entry" would be difficult to imagine. To enclose, or to partially enclose, a revolving mass of metal, a portion of which might become detached owing to centrifugal force is to offer facilities for it to jam the machinery.

In each of these regrettable accidents it is reported in the lay

Press that, according to eye-witnesses, the engine "exploded," whatever that term may mean.

Further, I think, in the design of aeroplanes fitted with an open-mouthed engine cowl, despite the enclosed revolving cylinders, air is enormously compressed within the open-mouthed hood, which compressed air upon the aeroplane meeting an "air-pocket" would immediately assert itself and might cause unstable equilibrium.

Upper Tooting.

J. F. SPONG.

The X Constant.

[1634] Kindly allow me to criticise Mr. Berriman's constant X.

The fact that the Bristol and Deperdussin monoplanes have values of X (anticipated flight speed m.p.h.) of 102 and 69 respectively. While the speeds actually obtained were of the order of 70 m.p.h. seems to suggest that the Bristol was under powered. This does not seem to me to be the case as I consider the Bristol's lack of flexibility of speed due rather to inability to change its position of flight than to low power.

At any rate it has a good power margin for climbing. Now, a glance at photographs of the machines in question will show that, in flight, the angle of incidence of the Bristol is greater than that of the Deperdussin.

A glance into the "Principles of Flight" will convince the unbelieving, if there be any such, of the important part played by the angle of incidence in the design of an aeroplane.

I trust, sir, that you will reconsider the proposition you have set forth in the new light shed on the subject by due consideration of the angle of incidence.

Liverpool.

T. FITZGERALD.

PUBLICATIONS RECEIVED.

How to take out Patents in England and Abroad. By Arthur E. Edwards. London: Wyman and Sons. Price 2s.

Catalogues.

1912 *Aerial Maximotor.* Maximotor Makers, 1526-1545, East Jefferson Avenue, Detroit, Mich., U.S.A.

Everything Aviatric, including Aeroplanes, Motors, Parts, &c. The Hamilton Aero Manufacturing Co., Seattle, Washington, U.S.A.

"Aera" Specialities for Aviation. Aera, 16, Avenue de la Grande Armée, Paris.

Aeronautical Patents Published.

Applied for in 1911.

Published September 26th, 1912.

- 20,229. P. BENNI. Automatic balancing of aerial machines.
- 20,572. J. L. GARSED. Treadle control for aerial machines.
- 22,407. A. E., H. L. AND H. O. SHORT. Flying machines.
- 22,409. A. E., H. L. AND H. O. SHORT. I.C. engines.
- 27,625. G. MEES. Hydro-aeroplane.
- 29,117. A. DOUTRE. Aeronautical machines.

PRINCIPAL CONTENTS

	PAGE
Editorial Comment ...	868
The War Office and the Monoplane.	
The Aeroplane in War.	
Hendon Second September Meeting ...	869
Hydrogen v. Coal Gas. By Griffith Brewer ...	871
Negative Pressure on Wings ...	873
Royal Aero Club. Official Notices ...	874
From the British Flying Grounds ...	875
The New 6-cylinder 100-h.p. Green Engine ...	878
British Notes of the Week ...	879
Foreign Aviation News ...	880
Airship and Balloon News ...	881
An Attempt to Investigate the Physical Properties of a Twisted Skein of Rubber. By W. W. Hastings Rider and Allan P. Hitchens, B. Eng. (Liverpool) ...	882
Progress of Flight about the Country ...	884
Models. Conducted by V. E. Johnson, M.A. ...	885
Correspondence ...	886

FLIGHT.

44, ST. MARTIN'S LANE, LONDON, W.C.

Telegraphic address: Truditur, London. Telephone: 1828 Gerrard.

SUBSCRIPTION RATES.

FLIGHT will be forwarded, post free to any part of the world at the following rates:—

UNITED KINGDOM.			ABROAD.		
	s.	d.		s.	d.
3 Months, Post Free ...	1	8	3 Months, Post Free ...	2	9
6 " " " ...	3	3	6 " " " ...	5	6
12 " " " ...	6	6	12 " " " ...	11	0

Cheques and Post Office Orders should be made payable to the Proprietors of FLIGHT, 44, St. Martin's Lane, W.C., and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.